The

Gardens' Bulletin

STRAITS SETTLEMENTS

Vol. VII. 10th May, 1933 Part 2.

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THE

GARDENS' BULLETIN

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Vol. VII. 10th May, 1933 Part 2.

ADDITIONS TO THE FLORA OF THE MALAY PENINSULA.

By M. R. Henderson, F.L.S.

In the following paper forty-five species of flowering plants are recorded as additions to the flora of the Malay Peninsula, and a few nomenclatorial changes are made. Of these forty-five species, twenty-nine are described as new to science.

The recent more intensive exploration of the limestone areas of the Peninsula has yielded a number of interesting plants, sixteen additions being recorded from these areas, including four genera hitherto unknown in the Peninsula. Cameron's Highlands, an extremely interesting area from a botanical point of view, has also added three genera to the flora, as well as six new species. In all, no fewer than nine genera are here recorded which are additions to the flora. They are *Acanthopanax* (Araliaceae), *Ainsliaea* (Compositae), *Cipadessa* (Meliaceae), *Keenania* (Rubiaceae), *Myriophyllum* (Halorrhagaceae), *Pistacia* (Anacardiaceae), *Richeriella* (Euphorbiaceae), *Sumbaviopsis* (Euphorbiaceae), *Sycopsis* (Hamamelidaceae). It is interesting to note that of these the following are unknown from the Malay Islands, but that each has a representative in Luzon in the Philippines:—*Acanthopanax, Pistacia* and *Sycopsis.* The genus *Richeriella* has hitherto been known only from one species in the Philippines.

I am indebted to the Director of the Royal Botanic Gardens, Kew, and the staff of the Herbarium; to Mr. H. N. Ridley and Dr. E. D. Merrill for much kindly help; and to the Royal Botanic Gardens, Calcutta, the Botanic Gardens, Buitenzorg and the Bureau of Science, Manila for the loan of valuable material for comparison.

The drawings in this paper have all been made from herbarium specimens.

ANONACEÆ.

Goniothalamus tortilipetalum, sp. nov. **(Plate XV).**

A *G. giganteo,* Hook. fil. et Thoms. cui probabiliter affinis, foliis glabris latioribus, floribus minoribus, cauliforibus, viridis differt.

A slender stemmed *tree* c. 6 metres tall. *Branchlets* glabrous, bark pale grey to black, finely longitudinally wrinkled. *Leaves* up to 27 cm. long and 9.5 cm. broad, oblong to oblong ovate, sometimes slightly oblong obovate, pale brown olivaceous shining above when dry, dull pale brown below, glabrous, but both surfaces with minute pale brown or black glandular dots, base cuneate, apex with a short abrupt blunt acumen; *main nerves* up to about 20 pairs, interarching at about 6 mm. from the margin, with a series of subsidiary loops nearer the margin, tertiary nerves distinct, at least above, reticulations wide and distinct, those and the nerves raised and distinct on the upper surface, much less distinct below; midrib channelled above, strongly raised below. *Petioles* 1-1.3 cm. long, stout, black, finely wrinkled, deeply channelled above. *Flowers* 9 cm. long, entirely green, rising from small irregular woody tubercles on the main stem only, usually solitary but sometimes in pairs. *Pedicel* 3 cm. long, glabrous, brown when dry and finely wrinkled longitudinally, tapering from the apex downwards. *Sepals* 3 cm. long, 2.8 cm. broad, broadly triangular ovate, coriaceo-membranous, slightly cohering at base, base broad, apex with short blunt point, nerves and reticulations strongly marked, glabrous, shining on outer surface, dull on inner surface, the apex and margins near the apex minutely rufous glandular hairy, the rest of the inner surface except the basal portion with minute glandular dots. *Outer petals* 8.8 cm. long, 3.1 cm. broad, twisted, leathery, lanceolate, tapering to a narrowed blunt point, sometimes cohering at base to inner petals, both surfaces with scattered, very minute glandular hairs, nerves on outer surface raised and conspicuous when dry, on inner surface sunk and much less distinct. *Inner petals* 2 cm. long, oblong lanceolate, thick, fleshy, strongly cohering by the margins in their upper 2/3, the upper 1/3 coherent into a fleshy mass. *Stamens* numerous, incurved, 4 mm. long, longer than the ovaries, but exceeded by the styles, glabrous, the connective produced into a fleshy subulate point 0.6-0.7 mm. long. *Ovaries* linear oblong, flattened, 2-2.2 mm. long, tapering slightly to apex, adpressed silky golden hairy. Styles 4.5-5 mm. long, linear, flattened, tapering to a fine subulate point,

exuding a mucilaginous gum which in the dried flower causes them to adhere in a sticky mass. *Ovules* 1 or 2. *Fruit* unknown.

PAHANG: Tembeling, in lowland forest west of railway station, on calcareous soil, *Henderson 24543* (type); flr. May. Malay name: *kenerak*.

Xylopia tembelingensis, sp. nov. **(Plate XVI).**

X. Curtisii, King affinis, sed foliis minoribus subtus tomentosis, sepalis acuminatis, petalis longioribus differt.

A *tree* c. 25 metres tall. *Branchlets* whitish grey to black, longitudinally finely wrinkled with scattered lenticels, the young twigs with a sparse stiff black pubescence, the youngest parts with a dense reddish yellow mealy tomentum. *Leaves* very coriaceous, up to 24.5 cm. long and 7.8 cm. broad, oblong lanceolate acute, margin somewhat undulate when dry, base narrowed, upper surface pale shining grey, glabrous, lower surface pale with a fine whitish close tomentum; *main nerves* 18 or 19 pairs, raised and bold below, connected by regular and almost straight cross veins; on upper surface nerves and reticulations distinct but very fine. *Petiole* up to 1.5 cm. long, stout, black, flattened or shallowly channelled above, sparsely pubescent or eventually nearly glabrous. *Flowers* yellow green, several together on stout, woody, tuberculate, sometimes branched extra-axillary peduncles c. 1 cm. long. Pedicels stout, 5-6 mm. long, reddish tomentose, bracteole broadly ovate to suborbicular, shortly acute, c. 7 mm. long and broad, reddish tomentose on both surfaces. *Sepals* spreading, 1 cm. long, fleshy, basal part broadly triangular ovate, 5-6 mm. wide just above base, rather abruptly narrowed into a triangular reflexed point, both surfaces tomentose except for the inner basal concave part. *Petals* subequal, somewhat fleshy, linear oblong or lorate with a tendency to be falcate, up to 6 cm. long but varying in length and width, the width varying from c. 2 mm. to 5 mm. or even more, narrowed usually to an obtuse point or sometimes almost truncate and mucronate, narrowed above the broadly ovate claw, and faintly keeled; the claw vaulted, glabrous within, tomentose without like both surfaces of the limb, and with a conspicuous keel. *Stamens* numerous, c. 65, 1.6-1.7 mm. long, filaments flattened below, connective obliquely truncate and depressed above, concealing the linear anthers. *Ovary* solitary, glabrous, cylindric, fluted, with very thick fleshy walls, together with stigma c. 3.2 mm. long, 1.2 mm. broad, multiovulate. *Stigma* pileate, fleshy, wrinkled. *Ripe carpels* oblong globose, up to 6.5 cm. long and 6 cm. broad, hard and woody, pale grey with numerous lenticels. *Seeds* c. 15-16, compressed, up to about 3 cm. long and 2 cm. broad.

PAHANG: Tembeling, in lowland forest to west of railway station, on calcareous soil, *Henderson 24533* (type); flr. and fruit May.

This species is evidently closely allied to *X. Curtisii*, King, having in common with it the stiff strongly nerved leaves, a similar flower with the pileate style, and hard globose woody carpels, but it differs in the tomentose lower surface of the smaller leaves, the differently shaped sepals and the much longer petals.

MELIACEÆ.

Dysoxylum undulatum, sp. nov. (Fig. 1).

D. ruguloso, King affinis, foliolis magis numerosis, floribus maioribus, fructu multo maiore differt.

A *tree* c. 12 metres tall. *Branchlets* stout, terete, longitudinally ridged, with prominent leaf scars, glabrous except for the youngest parts. *Leaves* up to c. 31 cm. long, equally pinnate, the petioles stout, minutely puberulous, swollen at base, flattened above; rachis angled, with fine raised lines running between the insertion of the petiolules. *Leaflets* usually 4 pairs, sometimes 5, subopposite or alternate, stiffly chartaceous or somewhat coriaceous when dry, lanceolate, ovate lanceolate or oblong lanceolate, acute, base cuneate, oblique or not, glabrous, up to 13 cm. long and 5 cm. broad; both surfaces minutely rugulose when dry and minutely black gland dotted; margins recurved and undulate; *main nerves* up to 9 pairs, raised and interrupted below, impressed and rather indistinct above; tertiary nerves and reticulations not visible except very faintly on very thin young leaves; *petiolules* stout, channelled above, 5 mm.—1 cm. long. *Racemes* spike like, stout, axillary or slightly supra-axillary, minutely pubescent, up to c. 8 cm. long. *Flowers* usually 3 or 4 together on very short stout bracteate peduncles, pedicels short, stout, jointed at the middle, densely minutely pubescent. *Calyx* shallowly and widely cupular, densely minutely pubescent, shortly 4-toothed, c. 1.8-2 mm. long and 5 mm. wide. *Petals* pale yellow green, oblong, apex triangular blunt, 8 mm. long, 3.2 mm. broad, reflexed in anthesis, tawny puberulous outside, much less densely so inside, apex and margins thickened. *Staminal tube* oblong, 4-angled, 7 mm. long and c. 3.2 mm. broad, constricted just below apex, margin slightly inflexed, rather irregularly 8-toothed, tawny puberulous on the angles, otherwise glabrescent outside and glabrous within. *Anthers* 8, very slightly exsert, narrowly oblong, c.

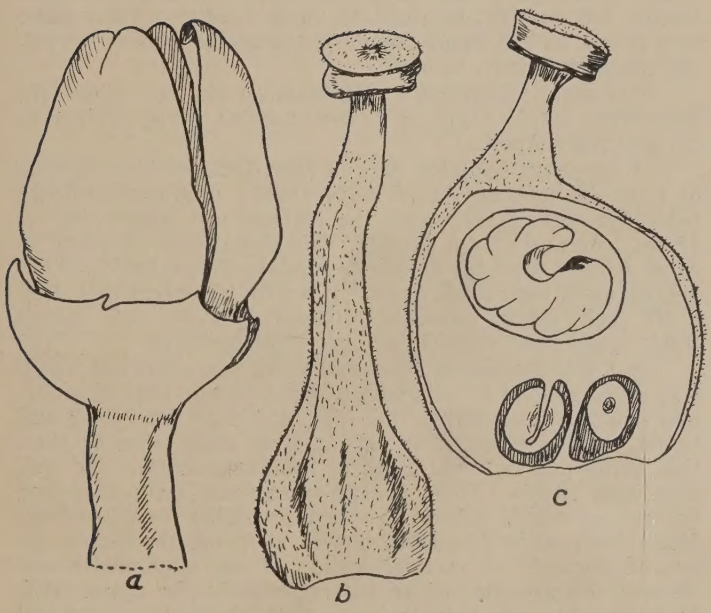

Fig. 1. Dysoxylum undulatum.

a. Bud, x c. 7.

b. Normal ovary and style, x c. 11.

c. Abnormal ovary and style, x c. 15.

1.1-1.2 mm. long. *Disc* shortly cylindric, slightly exceeding the ovary, c. 2 mm. long and broad, glabrous, fleshy, margin shortly erosulate dentate. *Ovary* 3-celled, ovoid or ovoid conic, vertically ridged, tawny pubescent, narrowed into the 4.5 mm. long style. Lower part of style 4-angled, pubescent, narrowing upwards, the upper 0.5 mm. glabrous. *Stigma* discoid with a basal annulus, top shallowly depressed or convex, pubescent. *Fruit* globose, ovoid, or depressed globular, very shortly apiculate, up to c. 5 cm. long and broad, narrowed at base into a short pseudostalk; pericarp woody, 5-6 mm. thick, glabrous, dark reddish brown when dry, yellow in life, finely rugulose, vertically ribbed. Fruiting peduncles stout, woody.

PAHANG: Cameron's Highlands, alt. c. 4600 ft., *Henderson 23484* (type of flower); *23624* (type of fruit); flr. and fruit April.

A specimen collected here in Nov. 1925 without flowers or fruit (*Henderson and Whitty 18007*) is almost undoubtedly this species although the leaflets are larger (up to 15 cm. long and 6.5 cm. broad). The Sakai name is given as *Sirai* (*Siral*), and the field note reads:—Inner bark saffron yellow, outer bark dark, apparently with large lenticels, 1/2-6/10 inch thick, sapwood distinct, yellow, 2-3 inches thick, heartwood reddish orange. Not common.

In a few flowers an abnormal ovary was observed which was ovoid conical or subglobose, much larger than the normal ovary and exceeding the disc, c. 2.8-2.9 mm. long and broad, narrowed abruptly into a style much shorter than that in normal flowers; loculi at base apparently with well developed ovules. These ovaries were found only in opened flowers, of which only a few were available for dissection. Many buds were dissected, but in all cases the ovary appeared normal. A vertical section of one abnormal ovary showed the presence of an insect larva in the upper half, as in fig. 1, c, so that it is possible that such abnormal ovaries are caused by insect attack.

Dysoxylum Corneri, sp. nov.

A speciebus aliis e peninsula malayana nervis magis numerosis, inflorescentia longissima spicatim recedit.

A *tree* 30-40 metres tall. *Branchlets* very stout, bark pale reddish brown and ribbed when dry, finely and closely yellow tomentose on youngest parts, otherwise glabrous. *Leaves* alternate, up to c. 75 cm. long, petiole stout, roughly triangular in section, rachis angled, the whole yellowish pubescent; *leaflets* 14-20, alternate or subopposite, chartaceo-coriaceous and brittle when dry, up to 19 cm. long and

6 cm. broad, oblong or occasionally lanceolate, caudate acuminate, base rounded or occasionally shortly cuneate, unequal; upper surface dull olivaceous brown or plumbeous, reddish brown in younger leaves, glabrous except for the yellowish pubescent midrib, minutely rugulose papillose with many minute black glandular dots; lower surface usually paler, glabrous except for the nerves and gland dotted like the upper surface; margins strongly recurved, almost revolute; midrib depressed above but with a raised central wing, very prominent below and more or less pubescent; *main nerves* up to about 25 pairs, slender and usually sunk above, elevate beneath, yellow pubescent or almost glabrous and then reddish, almost straight and parallel, curving rather abruptly up to the margin but not meeting; tertiary nerves short, usually almost invisible above and faint or invisible below; reticulations faint or invisible. *Petiolules* stout, channelled above, pubescent, c. 1 cm. long. *Inflorescence* an axillary apparently solitary spike exceeding 30 cm. in length, rachis stout, angled and striate when dry, closely and finely yellow tomentose, flowers in rather distant almost sessile cymules of 3 or 4. *Pedicel* very short and stout. *Calyx* shortly and widely campanulate or cup-shaped, c. 4.5 mm. long and 7 mm. wide, densely roughly pubescent, deeply wrinkled, margin obscurely 4-lobed and often incurved. *Corolla* in bud oblong, c. 9 mm. long. *Petals* 4 slightly imbricate in bud, at length reflexed, oblong blunt, densely reddish or yellowish tomentose outside, finely tomentose inside, somewhat fleshy, especially towards the apex, up to 10-12 mm. long and 3.5 mm. broad. *Staminal tube* c. 7 mm. long, 4-angled, cylindric oblong, somewhat constricted near the base, minutely pubescent outside especially on the angles, glabrous within; teeth 8, shortly and broadly triangular, blunt; *anthers* 8, included, oblong blunt, c. 1.2 mm. long. *Disc* cylindric annular, fleshy, c. 1.3 mm. tall, almost glabrous outside, densely pilose within with long shining pale yellow hairs, margin erosulate dentate. *Ovary* included within the disc, pyramidal, c. 1.2 mm. long and 1.5 mm. broad at base, densely pilose with long ascending shiny pale yellow hairs. *Style* 4-angled, hairy at the base like the ovary, glabrous above, 5 mm. long. *Stigma* cylindric capitate, with an annulus at the base, apex somewhat depressed and puberulous. *Fruits* 1-4 on stout peduncles up to 10 cm. long, pseudo-stalk very stout, 1-1.5 cm. long; depressed globose, 5-8 cm. long and 7-11 cm. broad, pumpkin-shaped, when dry deeply wrinkled and finely brownish mealy pubescent, in life bright gamboge yellow, probably turning orange or red when fully mature, loculi 4, marked

on outside over the septa by 4 deeply impressed lines radiating cruciately from the apex, 1-seeded, seeds 1-4 in each fruit, arillate.

SELANGOR: Weld Hill Forest Reserve, Kuala Lumpur, *Forest Dept. 2833* (type of flower), from tree No. 346, flr. March; same locality, *Forest Dept. sine num.*, from tree No. 345, flr. Feb.; same locality, *Forest Dept. 2433*, from tree No. 402, fruit July.

KEMAMAN: Bukit Kajang, Sungai Nipah, on hillside in forest, *Corner 25918* (type of fruit); fruit June.

The Malay names for this species vary considerably. The Weld Hill specimens are called respectively *Chengkuang, Gapis* and *Bekak. Corner 25918* is called *Keriah.*

The dimensions of the Weld Hill specimens are given as 70 feet high, girth 4 ft. 6 ins. The Kemaman specimen is much bigger, being 120 ft. tall, 60 ft. to the first branch, and 20 ins. in diameter 6ft. above the ground. The description of the fruit has been taken largely from Mr. Corner's copious field notes, further extracts from which are given below.

"Buttresses fairly prominent, 1 ft. wide, rising on an average to 5 ft. above the ground; bark light pinkish brown rather rough and flaky, fairly thick; sapwood white, heart wood dark reddish brown, trunk hollow in centre. Wood hard but easily split and rather brittle. Flesh of fruit very thick, pale yellow, with a watery sticky latex, the septa seen in transverse section as pale orange lines; seeds large with thick green cotyledons and fairly thick aril."

Cipadessa baccifera, Miq., Ann. Mus. Bot. Lugd. Bat. iv (1868-69) 6; Craib, Flor. Siam. Enum. i, 2(1926) 251.

KEDAH: Gunong Baling, *Best 20212.*

Aglaia tembelingensis, sp. nov. **(Plate XVII).**

Arbor parva. *Folia* ad 60 cm. longa. *Foliola* 11, imparipinnata, subopposita vel alterna, oblonga, ovato-oblonga vel obcuneata, ad 21 cm. longa et 8 cm. lata, supra glabra, subtus minute lepidota, nervis c. 18-jugis, supra impressis indistinctis, subtus elevatis stellato-tomentosis; *petioluli* ad 2 cm. longi. *Paniculae* ad 35 cm. longae, extra-axillares. *Calyx* 5-lobus, lobis inaequalibus, rufo-pubescentibus, ad 1.4 mm. longis et 1.2 mm. latis. *Petala* 5, 1.8-1.9 mm. longa et 1.1-1.2 mm. lata, ovato-oblonga vel obovata, glabra. *Tubus staminеus* breviter cylindricus, c. 0.6-0.7 mm. longus, glaber, antheris 5, margini adnatis, inclusis. *Ovarium* 2-loculare dense rufo-hirtum.

A small *tree. Branchlets* terete, densely covered with a minute brown scurf-like pubescence, with numerous paler

lenticels. *Leaves* up to c. 60 cm. long, unequally pinnate, petioles, rachis and petiolules scurfy pubescent. *Leaflets* usually 11, up to 21 cm. long and 8 cm. broad, the lower pairs alternate or occasionally subopposite, the upper pair opposite; lower leaflets oblong, oblong ovate or slightly obovate, apices abruptly acute, bases unequal, one side rounded, the other shorter and more or less cuneate; upper leaflets progressively more narrowed from about or above the middle, the terminal one obcuneate and much narrowed to the equal base; *petiolules* 1-2 cm. long; upper surface of leaflets dull grey or brown when dry, glabrous, lower surface dull reddish brown, very minutely scaly, the midrib and nerves with a shining brown red stellate pubescence; young leaves with a dense but quickly deciduous red stellate tomentum; *main nerves* about 18 pairs, prominent below, curving up into marginal loops, connected by fine but distinct, almost straight cross nerves; tertiary nerves very short; midrib and main nerves channelled on upper surface, rather faint, reticulations impressed, obscure. *Panicles* up to 35 cm. long, supra-axillary, usually rather lax, but occasionally strict, densely flowered, stellate red pubescent. *Pedicels* up to c. 2.5 mm. long, red pubescent, with a lanceolate acute bract c. 1.2 mm. long and 2 or 3 bracteoles. *Flower buds* ovoid, c. 2.2 mm. long and 2 mm. broad. *Calyx* 5-lobed, lobes unequal, somewhat concave, the largest broadly ovate, blunt, 1.4 mm. long and 1.2 mm. broad, externally densely red pubescent, internally glabrous, the smallest lobes of about the same length, but narrower and subacute. *Petals* 5, unequal, broadly ovate oblong or obovate, apex rounded, rather fleshy with thin margins, somewhat concave, glabrous, the largest c. 1.8-1.9 mm. long and 1.1-1.2 mm. broad. *Staminal tube* shortly cylindric, c. 0.6-0.7 mm. long, glabrous, rather fleshy, the mouth wavy. *Anthers* triangular, blunt, c. 0.3 mm. long, sessile on the margin of the staminal tube but inflexed so as to be included, at least in bud, into excavations on the inner face of the tube. *Ovary* 2-celled, broadly conical, depressed, not exceeding the staminal tube, densely red pubescent. *Stigma* glabrous, very short and broad, divided into 2 rounded lobes by a shallow depression. *Young fruit* broadly obpyriform or depressed globose, c. 2.5 mm. long and 3 mm. broad, densely shortly red pubescent, shallowly 4-lobed.

PAHANG: Tembeling, in lowland forest to west of railway station, on calcareous soil, *Henderson 24805* (type); flr. May.

This species does not seem to be closely allied to any of the Peninsular ones so far described, and would appear to approximate to *A. pauciflora*, Merr., a Philippine species.

SABIACEÆ.

Meliosma rufo-pilosa, sp. nov. **(Plate XVIII).**

Arbor c. 20 m., ramulis crassis. *Folia* imparipinnata, ad 55 cm. longa, foliolis 15 vel 17, lanceolatis, oblongo-lanceolatis vel ovatis, acuminatis, basi latis, plus minusve obliquis, ad 12 cm. longis et 4 cm. latis, nervis utrinque 8-13, subtus prominentibus, margine plerumque integro, plus minusve undulato, petiolis et petiolulis rufo-pilosis. *Paniculae* ad 55 cm. longae, multiflorae, inferne adpresse rufo-pilosae, ramulis et pedicellis ad 1.5 mm. longis fulvo-pubescentibus. *Sepala* 4, ovata vel ovato-lanceolata, inter se inaequalia, ad 2 mm. longa et 1-1.2 mm. lata, ciliolata. *Petala* exteriora glabra, late obovato-orbicularia ad 1.5-1.7 mm. longa et 2-2.8 mm. lata, interiora integra, oblongo-obovata c. 1 mm. longa, margine ciliolata. *Ovarium* glabrum.

A *tree* c. 20 metres tall. *Branchlets* very stout, terete, glabrous, pale brown to blackish brown, with numerous large conspicuous dark leaf scars. *Leaves* imparipinnate, crowded at branchlet ends, densely red pilose at insertion of petioles, up to c. 55 cm. long; *petiole* stout, expanded at base and flattened and slightly channelled above, black and finely longitudinally striate when dry under dense adpressed red hairs; rachis stout below, slender above, somewhat angled, grooved above, adpressed red hairy; *leaflets* 15-17, opposite or the lower ones alternate, 3.5-4.5 cm. apart, oblong, oblong-lanceolate to ovate, the lowermost pairs broader than the others, base broad and more or less oblique, the lower leaflets more oblique than the others, the upper ones often with cuneate and not oblique bases, lowermost leaflets c. 8.5 cm. long and 4 cm. broad, the upper ones from 6.5 cm. long and 2 cm. broad to 12 cm. long and 4 cm. broad, terminal leaflet lanceolate to oblong elliptic acuminate, base narrowed, equal, c. 7-8 cm. long and 3-3.5 cm. broad; upper surface when dry dull dark reddish brown glabrous except for a minute coarse pubescence on midrib and basal part of main nerves; lower surface reddish brown with long adpressed reddish brown deciduous hairs on midrib and main nerves; midrib sunk above, prominent below; *main nerves* c. 8-13 pairs, raised and fine above as are the reticulations, prominent below, almost straight or curving gently upwards and interlooping 3-5 mm. from the margin, with fainter subsidiary loops nearer the margin; cross nervules and reticulations raised and distinct; margin more or less undulate when dry, occasionally very obscurely toothed; *petiolules* 2-5 mm. long, adpressed red pilose below, channelled above and bordered by the decurrent margins of the blade. *Panicles* spreading, about as long as the leaves,

rachis stout, angled, adpressed red pilose towards base, red pubescent above, branches spreading, the lower primary ones up to c. 30 cm. long, the lower secondary ones of each branch up to 9-10 cm. long, bracts linear, densely red pilose, up to c. 3 mm. long. *Flowers* rather densely disposed on the densely fulvous pubescent ultimate branchlets, c. 2.5-3 mm. in diameter. *Pedicels* up to c. 1.5 mm. long, fulvous pubescent like the branchlets, bracteoles linear c. 0.3-0.5 mm. long, red pilose. *Calyx* lobes 4, ovate to ovate lanceolate, blunt or subacute, the largest c. 2 mm. long and 1-1.2 mm. broad, concave, the smallest c. 1.2-1.3 mm. long and 0.4-0.5 mm. broad, bases rather fleshy, margins thin and ciliate, glabrous within, the outer ones rufous pubescent at base without. *Petals* 5, the 3 outer broadly obovate orbicular, glabrous, one usually larger and much broader in proportion to length than the other two, c. 1.5 mm. long and 2.5-2.8 mm. broad, the other two c. 1.6-1.7 mm. long and 2 mm. broad; inner petals entire, attached to base of fertile stamens, oblong obovate blunt, c. 1 mm. long, margin at apex ciliate. Fertile *stamens* 2, c. 1.3-1.4 mm. long, filaments rather broad, flattened, apex expanded into a rather shallow bilobed cup; infertile stamens adnate to base of outer petals. *Disc* annular with 3 bifid processes with narrow blunt arms reaching about 2/3 up the ovary. *Ovary* glabrous, oblong or ovate oblong, apparently somewhat compressed, c. 0.6-0.7 mm. long, abruptly narrowed into a tapering glabrous style c. 0.7-0.8 mm. long. *Fruit* unknown.

PAHANG: Cameron's Highlands, c. 4600 ft., *Henderson 23657* (type); flr. pale green, in April.

Not closely related to any of the other Malay Peninsular species with pinnate leaves, and at once distinguished from them by the crowding of the leaves and panicles at the ends of the very stout branchlets in a manner that recalls some species of *Parishia* (Anacardiaceae).

ANACARDIACEÆ.

Pistacia malayana, sp. nov. **(Plate XIX).**

Arbor parva, ramulis glabris. *Folia* paripinnata vel imparipinnata, ad 11 cm. longa, rhachide anguste alata; foliola 7-8-juga, sessilia, alterna, subopposita vel opposita, glaberrima, oblongo-ovata vel oblongo-lanceolata, apice alte et late retusa, ad 3.5 cm. longa et 1.5 cm. lata, *nervis lateralibus* utrinque 7-9 supra prominentibus, subtus indistinctis, petiolo et rhachi sparse albo-pubescente vel fere glabro. *Paniculae* ♀ ad 7 cm. longae, sparse albo-pubescentes; pedicelli c. 0.5-0.7 mm. longi; *sepala* 4, c. 1 mm. longa et 0.5 mm.

lata, oblongo-ovata obtusa vel triangulari-ovata sub-acuta, ciliata; *ovarium* ovato-globosum, compressum, c. 0.6 mm. longum et latum; stylus brevis; stigmata 3, recurvata, dense et crasse pilosa. *Fructus* ovato-globosus, compressus, c. 4.5 mm. longus et 4.5 mm. latus.

A small much branched white barked *tree*. *Branchlets* stout, terete, glabrous, brownish or greyish brown, with raised lenticels. *Leaves* crowded towards branchlet ends, 9-11 cm. long, pinnate, usually without a terminal leaflet; petiole 1-2 cm. long, white pubescent, somewhat flattened above and very narrowly winged, slightly expanded at base; rachis sparsely white pubescent or nearly glabrous, narrowly winged, the wing broadest at the apex and there c. 0.5 mm. broad, narrowing downwards to the petiole; *leaflets* glabrous, 7-8 pairs, opposite, subopposite or alternate, sessile, or the lowermost one or two pairs very shortly petiolulate, up to c. 3.5 cm. long and 1.5 cm. wide, oblong lanceolate to oblong ovate, narrowed from about or a little below the middle to the base, apex rather deeply and widely retuse, almost emarginate, with a minute mucro at the base of the notch; texture thin in young leaflets, subcoriaceous in adult ones; upper surface reddish brown to black, shining when dry, lower dull and usually paler; margin recurved and somewhat undulate when dry; midrib raised and distinct on both surfaces; *main nerves* 7-9 pairs, spreading, fine but raised and distinct above, much less distinct below, reticulations practically invisible except by transmitted light. ♂ inflorescence unknown. ♀ *panicles* up to c. 7 cm. long from upper axils, sparsely white pubescent; flowers distant, subtended by persistent triangular ovate, concave blunt bracts coarsely ciliate on margin, c. 1-1.1 mm. long and 0.8-0.9 mm. broad; *pedicel* stout, c. 0.5-0.7 mm. long, with 2 bracteoles at apex oblong ovate concave, fleshy with thin coarsely ciliate margins, c. 0.7-0.8 mm. long; *perianth* lobes 4, c. 1 mm. long and 0.5 mm. broad, oblong ovate blunt or triangular ovate subacute, margins at apex with coarse reddish ciliate hairs, outer surfaces very minutely reddish scaly on median line; *ovary* ovoid globose, glabrous, strongly compressed laterally, oblique, pale coloured, c. 0.6 mm. long and broad; *style* short and stout, 3-partite almost to base, stigmas 3, large, recurved, almost revolute, flattened vertically, coarsely and densely reddish hairy on outer face, one much larger than the other two. *Fruit* ovoid globose, laterally compressed, somewhat oblique, c. 4 mm. long and 4.5 mm. broad, when dry pale brown and reticulate, when boiled finely longitudinally ridged, stigmas more or less persistent.

UPPER PERAK: Gunong Runto, Lenggong, c. 500 ft., on a dry rocky limestone ridge top, *Henderson 23831* (type); flr. and fruit June.

This species is closely allied to *P. weinnmanaefolia*, Pois. in Bull. Soc. Bot. France xxxiii (1886) 467, but is sufficiently distinct from it in the larger thinner leaflets more deeply and widely emarginate at the apex, in the pedicellate flowers and 4-not 5-lobed calyx.

The genus *Pistacia* has a distribution from the Canary Islands, the Mediterranean region, Abyssinia, Persia, Afghanistan, the Himalayas, Burma, Yunnan, North Central China and South China to Formosa and Luzon, with 2 species in Mexico and Texas. This is the first record of the genus from the Malaysian region.

CONNARACEÆ.

Connarus euphlebius, Merr. in Journ. Str. Br. Roy. As. Soc. 85 (1922) 200.

PAHANG: Pulau Tioman, *Henderson 21724.*

Described from British North Borneo.

LEGUMINOSÆ.

Abrus mollis, Hance in Journ. Bot. ix (1871) 130; Craib, Flor. Siam. Enum. i, 3(1928) 434.

PERLIS: Gua Nangka, *Henderson 23072.*

Desmodium lasiocarpum, DC., Prodromus ii, 328.

PERLIS: Gua Nangka, *Henderson 23075.*

Spatholobus compar, Craib in Kew Bulletin 1927, 62; Flor. Siam. Enum. i, 3(1928) 446.

PERLIS: Mata Ayer, near Kangar, *Henderson 23060.*

Vigna malayana, nom. nov. *Vigna parviflora,* Ridl. in Journ. Roy. As. Soc. Str. Br. 82 (1920), 181; Flor. Mal. Pen. i, 569, non Welw. ex Baker in Oliver Flor. Trop. Africa, ii (1871) 201.

Bauhinia decumbens, sp. nov.

Frutex scandens, cirrhosus. *Ramuli* juventute dense adpresse rufo-pubescentes, sulcati, demum glabri. *Folia* ad 6.5 cm. longa et lata, subrotunda, basi cordata, apice ad 1/3 bilobata, sinu triangulari, lobis acutis, supra matura glabra,

reticulatis tenuibus sed distinctis, subtus dense adpresse rubro-pubescentia, 11-nervia, nervis supra impressis, subtus prominentibus, petiolo ad 3.5 cm. longo. *Racemi* terminales vel axillares ad 9 cm. longi, adpresse rufo-pubescentes, pedunculo sulcato. *Bracteae* minutae, persistentiae. *Pedicelli* ad 2.5 cm. longi. *Calyx* in segmenta 2 vel 3 fissus, demum reflexa, extus rufo-pubescens, inter glaber. *Petalum posticum* subrotundum vel obovatum, stipite 1.5 mm. longo incluso 7-8 mm. longum, 6 mm. latum, extus rufo-pilosum, intus basi pilosum. *Petala lateralia* et antica subaequilonga ad 1.3 cm. longa et lata, stipitis rufo-pilosis ad 4 mm. longis, extus adpresse rufo-pilosa, intus glabra. *Stamina* fertilia 2 vel 3, filamentis c. 5.5 mm. longis, rufo-pilosis, ad apicem glabris, antheris glabris 2 mm. longis et latis. *Pistillum* dense rufo-pilosum c. 9 mm. longum, stipite c. 2 mm. longo, *stylo* c. 5 mm. longo, ovulis 4 vel 2.

A low *scrambling shrub* with tendrils. Young shoots, stems and tendrils densely adpressed red pubescent, young stems grooved when dry; older parts of stem and tendrils brownish black when dry, with a sparse pale pubescence, eventually becoming glabrous and lenticellate. *Leaves* subrotund, 6.5 cm. long and broad, deeply and narrowly cordate at base, apex deeply bilobed, the sinus rather wide, triangular, the lobes triangular acute up to about 2.5 cm. long; texture coriaceous, upper surface with a fine but distinct raised reticulation, glabrous except for a fine brown pubescence on the main nerves in the younger leaves, the lower surface densely covered with adpressed, shining, deep coppery-red hairs, persistent but becoming paler in older leaves, edge of leaf somewhat thickened and white hairy. *Stipules* deciduous. Insertion of petiole glandular, emitting 11 nerves sunk above, prominent below and covered with the same pubescence as the under surface of the leaf; transverse nerves inconspicuous above, not prominent below except in older leaves. *Petiole* up to about 3.5 cm. long, clothed with the same pubescence as the young stems. *Racemes* terminal or axillary, c. 9 cm. long, all parts adpressed red pubescent, peduncle sharply 4-angled and grooved. *Bracts* very small, persistent. *Pedicels* up to 2.5 cm. long. Buds globose with a very short point. *Calyx tube* 1.3 cm. long, ribbed, narrowed into but distinct from pedicel, which has 2 minute bracteoles, one 2 mm. below the other, the uppermost 4 mm. below the apex of pedicel. *Calyx* splitting into 2 or 3, usually 2 oblong ovate blunt lobes c. 5 mm. long, adpressed red pubescent outside, glabrous within, reflexed after expansion of flower. *Upper petal* subrotund or broadly ovate, lamina 6 mm. long and broad, outer surface with long adpressed coppery-red shining hairs, the

inner glabrous except on the nerves, narrowed into a red-pilose claw c. 1.5 mm. long. *Lateral* and *lower petals* subequal, much larger than upper petal, lamina rotund, up to c. 1.3 cm. long and broad, the tip sometimes retuse, outer surface adpressed pilose as in upper petal, inner surface glabrous, bullate, the sunk veins conspicuous in life, less so in dried specimens, claw red pilose c. 4 mm. long. *Stamens* 3, subequal, one sometimes reduced, filaments broad at base, densely red pilose, tapering at apex and there glabrous, c. 5.5 mm. long, anthers glabrous, 2 mm. long and broad. *Pistil* 9 mm. long, stalk c. 2 mm. long, densely covered with shining red hairs, *style* c. 5 mm. long; *ovules* 2 or 4. *Fruit* unknown.

PAHANG: Gunong Senyum, on open top of limestone hill, scrambling over rocks, *Henderson 22268* (type); flr. July.

Evidently allied to *B.cuprea,* Ridl., to which it was at first referred, but distinct from that species in its smaller, stiffer, more deeply cordate leaves with more nerves, and in the more rounded flower buds and the smaller, more hairy flowers.

The shining deep coppery-red indumentum on the backs of the leaves and petals is very striking.

ROSACEÆ.

Pygeum odoratum, sp. nov. **(Plate XX).**

Affinis *P. Scortechinii,* King, sed foliis glandulosis, pro rata latioribus, subtus minus rugulosis, nervulis magis prominentibus, racemis longioribus, staminibus magis numerosis differt.

A rather stout bushy *tree* c. 12-14 metres tall. *Branchlets* terete, black, striate, lenticellate, obscurely adpressed reddish yellow pubescent, at length glabrous. *Leaves* thinly coriaceous, up to 8 cm. long and 4.25 cm. broad, elliptic lanceolate to elliptic ovate, apex acute or shortly obtusely acuminate, base cuneate with 2 glands usually between the first and second pair of nerves; upper surface glabrous, more or less shining dark reddish brown, lower surface slightly rugulose, dull brown, glabrous except for a few minute and very obscure adpressed bristles on the recurved margins, youngest leaves adpressed bristly hairy below and on the midrib above; midrib channelled above, prominent below; *main nerves* 7-9 pairs, impressed and rather indistinct above, slender but distinct and raised below, curving up to and along the margin and anastomosing;

cross nervules and reticulations almost invisible above, lax below, raised and rather faint. *Petiole* up to 1 cm. long, channelled above, sparsely pubescent especially near the base, or almost glabrous. *Racemes* solitary axillary, 4-5 cm. long, covered with coarse adpressed reddish yellow bristly hairs, as are the pedicels and calyces. *Pedicels* 3-4 mm. long. *Calyx tube* narrowly campanulate or somewhat obconic, c. 2 mm. long, lobes 6, linear oblong, c. 1.8 mm. long, very hairy. *Petals* 6, similar to calyx lobes but smaller and caducous. Stamens about 24-26, in 2 series, filaments glabrous, exserted, up to 4 mm. long. *Ovary* ovoid, c. 1 mm. long, sparsely hairy with long shining pale yellow hairs, *style* c. 4.2 mm. long, glabrous or with a few shining yellow hairs. *Stigma* capitate. *Fruit* unknown.

PAHANG: Cameron's Highlands, alt. c. 4800 ft., *Henderson 23278* (type) ; flr. April. A very floriferous tree, the flowers white with a pink tinted calyx, strongly rose scented.

Parinarium latifolium, sp. nov.

Ab speciebus aliis e peninsula malayana foliis latioribus, inflorescentiis brevioribus, floribus maioribus recedit; affinis *P. glaberrimo,* Hassk., sed ramulis foliisque haud glabris, foliis latioribus differt.

A small *tree* c. 5 metres tall. *Branchlets* terete, covered with a long woolly yellowish tomentum. *Leaves* thinly coriaceous, 18-21 cm. long, 10-11.5 cm. broad, broadly elliptic, apex shortly and abruptly caudate acuminate, base shortly rounded, upper surface glabrous, lower surface sparsely strigose on midrib, main nerves and reticulations; midrib raised above, prominent below, main nerves and reticulations impressed and distinct above; *main nerves* c. 14 pairs, strongly raised below, curving up to the margin and anastomosing, tertiary nerves and cross nervules very distinct, reticulations fine but distinct. *Petioles* stout, 5-7 mm. long, yellow woolly. *Inflorescence* spike like, up to 5 cm. long but possibly elongating further, densely tawny silky, bracts numerous, oblong ovate to ovate lanceolate, acute, adpressed tawny hairy outside, adpressed yellowish pubescent inside, up to 1.5 cm. long. *Calyx* tube narrow oblong cylindric, 7-8 mm. long, adpressed pubescent, lobes broadly lanceolate or oblong ovate, acute, 10 mm. long, outside densely adpressed long hairy, inside densely shortly pubescent. *Petals* thin, glabrous, obovate, narrowed to rounded base, 10-11 mm. long, 7-8 mm. broad. *Stamens*

c. 20, united below into a ring c. 2 mm. tall and red pubescent within, filaments slender, tapering upwards, 10-12 mm. long. *Ovary* densely red pilose, style slender, as long as the stamens. *Fruit* unknown.

KEDAH-PERAK boundary: Bukit Kuala Ketang, nr. Gunong Bintang, *Haniff 21119* (type).

HAMAMELIDACEÆ.

Sycopsis sp.

PAHANG: Cameron's Highlands, alt. c. 4600 ft., *Henderson 23567, 23316*. A slender tree c. 50 ft. tall. Unfortunately only fruiting specimens have been collected, and the generic status of the plant is therefore doubtful. It somewhat resembles *Sycopsis tutcheri*, Hemsl. from China, but is distinct from that and other described species.

What appears to be another species of the same genus was collected, also in fruit, in the same locality under the Sakai name of *Senglong* (*Henderson and Whitty 18084*).

So far the genus *Sycopsis* has been recorded only from the Himalayas, China and the Philippines.

HALORRHAGACEÆ.

Myriophyllum sp.

JOHORE: Bukit Tiga, Sungai Sedili, *Corner sine num.* "Common by edge of river from Kuala Bohol to a short way below Bukit Tiga. Does not grow in the salt water of the mangrove reaches." Malay name: *Rumput Ekor Kuching.*

Unfortunately only the submersed stems and leaves, without flowers or fruit have so far been found, so that it is impossible to say to what species it may belong.

This is the first definite record of the family from the Malay Peninsula.

MELASTOMACEÆ.

Medinilla crassiramea, sp. nov. **(Plate XXI).**

Ab *M. perakense*, King ramulis multo crassioribus, magis tuberculatis, nervis subtus pubescentibus, inflorescentiis maioribus, pubescentibus, differt.

A large *epiphytic shrub*. *Branchlets* very stout and woody, 1-1.5 cm. in diameter, bark rough and longitudinally cracked, pale under a dense rufous furfuraceous tomentum and with numerous large rounded tubercles. Nodes thickened, 5-6 cm. apart, bearing whorls of 5 leaves. *Leaves* stiffly coriaceous when dry, up to 15 cm. long and 9 cm. broad, ovate, oblong ovate or elliptic rotund, apex blunt, rounded or minutely retuse, base cordate, pale when dry, glabrous above, below with very sparse minute reddish hairs, midrib very prominent below; *main nerves* 3 pairs, 2 pairs basal the third from higher up the midrib, the lower most pair of the basal nerves very faint, running parallel to and close to the margin, the second pair much more prominent, also running parallel to the margin, but becoming faint near the apex, the third pair bold, curving inwards at apex to meet the midrib; midrib and main nerves densely adpressed red hairy below, glabrous and much less distinct above, the straight cross nervules just visible on both surfaces as faint impressed lines. Petioles stout, up to 5 cm. long, red adpressed hairy when young, glabrescent when older and longitudinally striate. *Cymes* umbelliform, from axils of lower or fallen leaves, up to 7 cm. long and wide, the common peduncle 4-5 cm. long, bearing at its apex about 10 branches c. 2 cm. long which are usually again umbellately branched, each branchlet with a few flowers, the whole inflorescence rusty furfuraceous. *Pedicel* short. *Calyx* obconic, somewhat angled, 3-4 mm. long, 3.5 mm. wide, sparsely red hairy, teeth 5, minute, subulate, acute. *Petals* 5, white, up to 5.5 mm. long and 5 mm. wide, oblong ovate, obovate or obovate rotund, 2 usually larger and broader than the other 3, apex rounded, truncate or minutely apiculate. *Stamens* 10, equal, filaments 3 mm. long, anthers inflexed in bud, 2-2.5 mm. long, with 2 very small blunt tubercles at the base in front and a very short blunt spur behind. *Style* 4.5 mm. long. *Fruit* (? unripe) more or less globular, sparsely rusty pubescent, crowned by calyx, c. 5.5 mm. in diameter.

PAHANG: Gunong Batu Brinchang, Cameron's Highlands, alt. c. 6600 ft., epiphytic on ridge-top trees, *Henderson 23588* (type); flr. and fruit April.

Remarkable on account of the very thick and rough branches.

Marumia dimorpha, Craib in Kew Bull. 1930, 320; Enum. Siam. Pl. i, 4, 696.

PAHANG: Tasek Bera, *Henderson 24057*.

Described from Lower Siam.

Sonerila Whittyi, Hend. in Journ. Mal. Br. Roy. As. Soc. v, 2 (1927) 249. Further collections of this plant

from the type locality show it to be synonymous with **Sonerila capitata,** Stapf & King, Mat. Flor. Mal. Pen. No. 11 (1900) 35; Ridl., Flor. Mal. Pen. i, 787.

ARALIACEÆ.

Schefflera musangensis, sp. nov. **(Plate XXII).**

S. venulosa, Harms. affinis, sed foliolis latioribus, nervis lateralibus haud obliquis, nervis nervulisque supra minus, subtus magis conspicuis, floribus maioribus differt.

An epiphytic climbing *shrub*. *Leaves* digitate, leaflets coriaceous, 3-6, 7-20 cm. long, 3-9 cm. wide, variable in shape from elliptic lanceolate to ovate or obovate, base rounded or abruptly shortly cuneate, often oblique, apex acute, margin usually somewhat thickened with distant shallow crenatures or almost entire, glabrous, upper surface shining pale yellowish or greenish brown when dry, lower surface dull pale brown; *main nerves* up to about 13 pairs, spreading, (the basal pair oblique) prominent and somewhat irregular below, some leaves having only half the normal number, curving up at the margin and anastomosing, reticulations lax and conspicuous; nerves and reticulations usually indistinct above; *petiole* up to 26 cm. long, stout, glabrous, finely longitudinally ridged when dry, petiolules 1-6 cm. long, glabrous and ridged like the petioles. *Panicles* terminal, up to 12 cm. long and about 18 cm. across, with up to about 8 glabrous, flattened and finely longitudinally ridged branches, peduncles spreading, c. 2 cm. long, bearing dense umbels of 15-20 flowers. *Pedicels* c. 3 mm. long. *Calyx* obconic, c. 1.5 mm. long, and 3 mm. wide across the mouth, margin minutely toothed. *Petals* 5 or 6, triangular ovate acute, 3.2 mm. long, 2 mm. broad, apex thickened, reflexed in anthesis. *Disc* short fleshy, wrinkled. *Stamens* as many as petals, filaments slender, 4.5 mm. long, somewhat dilate at base. *Anthers* deltoid, blunt, dorsifixed, cells finely reticulate and free from one another for a short distance at apex and base. *Fruit* oblong, broadly oblong, or elliptic, sharply 6 or 7 ridged, c. 6-7 mm. long.

KELANTAN: Sungai Galas at Gua Musang, climbing on riverside trees of *Dipterocarpus oblongifolius,* Bl., *Henderson 22599* (type); flr. and fruit Aug.

Acanthopanax malayana, sp. nov. **(Plate XXIII).**

Arbor glaber (ad c. 16 m.), rami glabri, sulcati, inermes. *Petioli* ad 12.5 cm. longi. *Foliola* 3-5 digitatim, lanceolata, ad 16 cm. longa et 5.5 cm. lata, glabra, margine

spinulosa. *Pedunculi* ad 9.5 cm. longi, glabri, sulcati. *Pedicelli* ad 2 cm. longi, graciles, glabri. *Calycis* tubus campanulatus, breviter 4-dentatus. *Petala* 4, ovato-oblonga, mucronata, reflexa, 2.5 mm. longa et 1.5 mm. lata. *Stamina* 4, filamentis c. 2.7 mm. longis. *Styli* 2 in unum concreti vel ad medium bifidi. *Fructus* ignotus.

A slender unarmed *tree* up to about 16 metres tall, bark rather smooth and papery, wood soft and white. *Branchlets* pale, glabrous, longitudinally ridged when dry. *Leaves* digitate, clustered at branch ends, 3-5 foliolate, glabrous; *leaflets* lanceolate acute, narrowed to base, up to 16 cm. long and 5.5 cm. broad, margin with rather long spinulose teeth; *main nerves* up to 10 pairs, prominent below and interarching, less prominent above; both surfaces with a close raised reticulation, more prominent above than below. *Petioles* up to 12.5 cm. long, glabrous, longitudinally ridged when dry. *Petiolules* 1 cm. long or shorter. *Flowers* umbelled, peduncles up to 9.5 cm. long, glabrous and ridged like the petioles; about 40 to 50 flowers to an umbel, pedicels slender, glabrous, up to 2 cm. long. *Calyx* campanulate, c. 1.2-1.4 mm. long, teeth 4, small, broadly triangular ovate acute. *Petals* 4, ovate oblong mucronate, green tinged red, reflexed, somewhat leathery in texture, slightly glandular pubescent at apex, 2.5 mm. long and 1.5 mm. broad, distinctly keeled within. *Stamens* 4, filaments linear flattened, tapering upwards, c. 2.7 mm. long; *anther cells* dorsifixed, sub-reniform, introrse, c. 1.5 mm. long. *Styles* 2, connate at first for their whole length, but becoming free to about half way in older flowers. *Disc* conspicuous in life, yellow green. *Fruit* unknown.

PAHANG: Cameron's Highlands, beyond Tanah Rata, alt. c. 4600 ft., *Henderson 23476* (type); flr. April; near Brinchang camp, on ridge-tops, alt. c. 5200 ft., *Henderson and Whitty 18016, 18042* (sterile specimens). Sakai name: *Berlaki.*

This tree was not uncommon near the path between Tanah Rata and Brinchang camp, occurring in groups of a few individuals, and conspicuous when flowering by reason of its rather delicate feathery foliage which was pale green with a reddish tinge, the petioles and inflorescence also being reddish tinged.

This is the first record of the genus *Acanthopanax* from the Malay Peninsula. It extends from India to China and Japan, and one species has been recorded from the northern part of Siam and from the Philippines. It does not appear to be recorded from Sumatra, Java or Borneo, and this would seem to be its furthest known extension southwards.

CORNACEÆ.

Alangium Kurzii, Craib in Kew Bulletin 1911, 60; Flor. Siam. Enum. i, 4(1931) 806.

PAHANG: Pulau Tioman, *Henderson 21750.*

RUBIACEÆ.

Keenania modesta, Hook. fil., F.B.I. iii, 101.

PAHANG: Sungai Tahan, *Ridley;* Sungai Tekai, in flood damaged jungle on riverbank, *Henderson 24846.*

NEGRI SEMBILAN: Gunong Tampin, *Burkill 3169.*

These specimens agree well with the original collection from India. I have not seen *Keenania capitata,* Craib, Enum. Siam. Pl. ii, 82 (*Myrioneuron capitatum,* Ridl.), but this apparently differs from our plant in the longer peduncle. *Keenania modesta* has hitherto been known only from the type collection from Cachar.

Lasianthus scalariformis, King and Gamble, Mat. Flor. Mal. Pen. No. 15, 131. **(Plate XXIV).**

This species was described from scanty material collected on Gunong Batu Puteh, Perak at an altitude of 6700 ft., *Wray 332;* and in Perak without locality or number by *Scortechini.* It was collected again in Pahang, on Gunong Tahan, alt. c. 6000 ft., *Holttum 20722;* and on Gunong Batu Brinchang, Cameron's Highlands, alt. c. 6500 ft., *Henderson 23593.*

The following is a description of the inflorescence:— *Peduncles* solitary, ebracteate, stout, up to c. 1 cm. long, glabrous or stiffly sparsely black hairy, finely longitudinally striate when dry, with 2 branches 2-4 mm. long subtended by very small narrow acute bracts and each bearing usually 3 flowers. *Flowers* sessile, c. 6 mm. long. *Calyx* tube obconic or campanulate, c. 2 mm. long and 1.5 mm. broad at apex, lobes 5, c. 4 mm. long and 1.5 mm. broad, oblong ovate or oblong lanceolate ovate, acute or somewhat rounded at tip, base broad, rather fleshy, margin sparsely adpressed setose pilose, outer surface glabrous, inner sparsely adpressed pilose near base or nearly glabrous, when dry strongly keeled on the median line within and deeply channelled without. *Corolla* pale lilac, early deciduous, cylindric oblong, c. 5 mm. long and 2 mm. broad, sparsely puberulous without; lobes 5, reflexed, triangular or narrowly triangular ovate acute, glabrous within except at apex, puberulous without, c. 2-2.5 mm. long, apex thickened; throat of corolla

densely pilose with long pale hairs. *Anthers* narrow oblong, c. 1.2 mm. long, filaments very short. *Style* c. 5.5 mm. long, slender, glabrous, tapering upwards, stigma of 2 broadly obtriangular retuse lobes. *Disc* annular, c. 0.5 mm. tall and 1.2 mm. across, with 5 very thick and fleshy blunt rounded lobes. *Fruit* globose, narrowed to base, c. 4 mm. long and 3.5 mm. broad, crowned by the persistent calyx lobes, when dry with 5 conspicuous broad flattened ridges.

Wendlandia ternifolia, Cowan in Notes Roy. Bot. Gard. Edinb., Vol. XVI, No. lxxx (1932) 279.

JOHORE: Pulau Pelandok at sealevel, *Holttum 24960;* flr. July.

Described from Indo-China.

Attention may be called here to Dr. J. M. Cowan's recent monograph on the genus *Wendlandia* in the publication cited above. He erects two new species, *W. arborescens* and *W. Burkillii,* for the Malay Peninsular plants which up to the present have been considered to belong to *W. paniculata,* DC.

COMPOSITÆ.

Ainsliæa reflexa, Merr. in Philipp. Journ. Sci., i (1906) Suppl. 242; Enum. Philipp. Pl. iii, 620.

PAHANG: Cameron's Highlands, c. 5000 ft., *Holttum 24991.*

This is the first record of the genus from the Malay Peninsula. *A. reflexa* is known from the Philippines and Formosa, and the rest of the genus is mostly Chinese and Japanese, with species in the Himalayas and Burma and one in Sumatra.

LOBELIACEÆ.

Pratia montana, Hassk., Cat. Hort. Bog. Alt. 106.

PAHANG: Cameron's Highlands, c. 4800 ft., *Henderson 23296;* flr. April.

Distrib: Sumatra and Java.

APOCYNACEÆ.

Urceola montana, sp. nov. **(Plate XXV).**

A *U. torulosa,* Hook. fil. inflorescentia multo maiore et laxiore, sepalis minoribus, acutis, lobis corollæ intus pilosis, folliculis multo brevioribus, vix torulosis recedit.

A *liane* climbing on tall trees. *Branchlets* black when dry, finely striate and with numerous pale lenticels, youngest

twigs brown. *Leaves* opposite, up to 12 cm. long and 5 cm. broad, much smaller on branchlet ends, glabrous, thinly coriaceous, lanceolate, oblong lanceolate to elliptic, apex shortly and obtusely caudate acuminate, base narrowed, upper surface shining reddish brown when dry, lower dull and paler; midrib impressed above, elevated below; *main nerves* up to about 8 pairs, rather faint and usually impressed above, conspicuous and raised below, curving along and anastomosing indistinctly close to the recurved margin, transverse nervules and reticulations not conspicuous except in young leaves. *Petiole* glabrous, c. 1.5 cm. long, channelled. *Inflorescence* axillary and terminal of trichotomous panicles of cymes, up to 10 cm. long and broad, minutely sparsely pubescent, primary peduncles up to about 4.5 cm. long, secondary 1-1.3 cm. long, tertiary 7-8 mm. long, bracts linear lanceolate c. 3 mm. long; cymules lax, of about 4 flowers, pedicels c. 4 mm. long, bracteoles very small. *Calyx* lobes 5, somewhat spreading, broadly triangular ovate acute, edges minutely pubescent, c. 0.6-1 mm. long, 0.5-0.8 mm. broad. *Corolla* 5-lobed, urceolate or subglobose, c. 2 mm. long. *Petals* easily separable from one another, up to about 2.2 mm. long and 1 mm. broad, ovate lanceolate, blunt or subacute, fleshy, glabrous outside except for a minute pubescence at the apex, within with long shining adpressed white hairs and a glandular thickening on the margins just above the tips of the stamens. *Stamens* sagittate, 1.3 mm. long, filaments short, broad, flattened, c. 0.5 mm. long; anthers c. 1 mm. long, apex thin, rounded; spurs straight. *Disc* conspicuous, fleshy, cylindric annular, c. 0.4 mm. tall, edge wavy. *Ovary* of 2 carpels not exceeding the disc, but surrounded by a dense ring of long hairs protruding beyond the disc. *Style* and stigma c. 1 mm. long, style short, broad, obconic. *Stigma* narrowly conic acute, ridged. *Follicles* up to 9 cm. long and about 1-1.5 cm. thick, diverging only slightly, tapered to apex and base, with a few broad, shallow constrictions, scarcely torulose. *Seeds* unknown.

PAHANG: Cameron's Highlands, 4600-4800 ft., *Henderson 23601* (type), *23472, 23486;* flr. and fruit April. Flowers white or greenish white, fragrant. Follicles brown.

Apparently intermediate between those species with terete or dagger shaped follicles and those with definitely torulose and very much elongated follicles.

ASCLEPIADACEÆ.

Toxocarpus glabrescens, sp. nov. **(Plate XXVI).**

T. Curtisii, King et Gamble affinis, foliis pro rata angustioribus, glabris, vix obovatis, inflorescentiis et sepalis fere glabris differt.

A slender *climbing shrub*. *Branchlets* glabrous, pale brown, angled and ridged, youngest parts sparsely red hairy. Leaves elliptic lanceolate, elliptic, or slightly elliptic obovate, up to 9.5 cm. long and 4.5 cm. wide, glabrous, coriaceous, apex cuspidate acuminate, base cuneate, upper surface when dry shining reddish or olivaceous brown, lower paler and duller; midrib impressed above, bold below with sparse adpressed red hairs; *main nerves* 5-6 pairs, distant, faint above, distinct below, starting at an angle of about 70° to the midrib, at first straight then curving up to form somewhat indistinct loops a little distance from the recurved margin; reticulations rather indistinct. *Petioles* up to 1 cm. long, adpressed red hairy when young, becoming glabrous when older. *Cymes* 3-4 cm. long, sparsely red hairy or almost glabrous, sessile or shortly pedunculate, branches 2-4, divaricate, flowers racemosely clustered on the branchlets; bracts small, ovate blunt, edge and back rufous hairy; *pedicel* less than 1 mm. long, bracteoles similar to bracts but smaller. *Calyx* tube short, lobes 1.8-2 mm. long, 1.2-1.4 mm. broad, ovate blunt, slightly concave, thickened in centre, edges thin, a few red hairs on the outside and on the margin at the apex. *Corolla* c. 6 mm. long in bud, tube 2-2.5 mm. long, inflated at base, lobes c. 4 mm. long, linear oblong, blunt, twisted, somewhat thicker in texture than the tube. *Corona* processes adherent to anthers and much longer than them, the bases broad and horizontally 2-toothed, the tips produced into long points at first bent inwards at right angles towards the style apex, then again at right angles vertically; connective with a minute broad appendage bent inwards. *Style* apex annular and lobed at base with a subulate process 3.5-4 mm. long which is flattened and flexuous and sometimes twisted in the upper one-third. *Fruit* unknown.

JOHORE: Tanah Abang, Endau river, alt. c. 700 ft., *Holttum 24937* (type); flr. July. "Climber on hilltop. Flower buds purple, petals yellow suffused purple towards edges."

Toxocarpus pauciflorus, sp. nov. **(Plate XXVII).**

Inter species peninsulae malayanae foliis minoribus, inflorescentiis laxioribus, floribus paucioribus distincta.

A slender climbing shrub. *Branchlets* brown when dry, ridged, glabrous or sparsely reddish hairy. *Leaves* chartaceo-coriaceous, up to 5.5 cm. long and 3.5 cm. broad, elliptic lanceolate, elliptic or ovate, apex shortly and broadly caudate acuminate, base narrowed and rounded, rarely cuneate, upper surface glabrous, reddish or greenish brown, lower surface pale, with very sparse reddish hairs; midrib impressed above, raised below; *main nerves* 3 or 4 pairs,

distant, impressed and rather faint above, raised below, leaving the midrib at an angle of about 50° and curving up to form loops some distance from the margin; tertiary nerves and reticulations lax, impressed and indistinct above, raised and more or less distinct below. *Petioles* 5-8 mm. long, sparsely red pubescent or nearly glabrous. *Cymes* up to 2.5 cm. long, lax, sessile, usually with two divaricating slender branches, very sparsely red hairy or almost glabrous, cymules of 2 or 3 flowers. *Pedicel* slender 5-6 mm. long. *Calyx* tube very short, scales very minute, alternate with the lobes, lobes ovate lanceolate blunt, c. 2 mm. long and 1 mm. broad, margin towards apex shortly ciliate, outside with a few long adpressed red hairs or nearly glabrous. *Corolla* tube urceolate or subglobose c. 2 mm. long, glabrous without, pubescent within, lobes linear oblong acute, twisted, c. 6.5 mm. long, glabrous except at base within. *Coronal* processes laterally flattened, back expanded, with 2 horizontal blunt lobes at base, apex 2-toothed, the outer tooth narrow triangular acute, slightly incurved, the inner subulate, slightly longer and incurved to the style apex; connective very broad, very shortly and minutely appendaged. *Style* 0.5-0.6 mm. long, apex annular with a columnar process 1.5 mm. long bifid at apex. *Fruit* unknown.

PAHANG: Bukit Chintamani, between Bentong and Karak, on the edge of a clearing at base of limestone cliff, *Henderson 25034* (type); flr. dull pink, in October.

Tylophora Ridleyi, nom. nov.

Gymnema flava, Ridl. in Journ. Str. Br. Roy. As. Soc. lvii (1911) 68; Flor. Mal. Pen. ii, 385.

The presence of coronal scales attached to the staminal column and the included style apex would place this plant in *Tylophora* rather than *Gymnema*.

Tylophora calcicola, sp. nov. (Fig. 2).

T. Ridleyi Hend. affinis, sed foliis multo maioribus, semper cordatis, petiolis longioribus, pedicellis longioribus, floribus albis haud flavis differt.

A slender *twiner*, older stems glabrous, angled and ridged, younger parts terete, sparsely pubescent. *Leaves* membranous when dry, somewhat coriaceous when old, up to 8.5 cm. long and 5 cm. broad, ovate or oblong ovate acuminate, base cordate, margin minutely ciliate pubescent, otherwise glabrous; midrib slender, raised on both surfaces, minutely and sparsely puberulous above; *main nerves* 4-6 pairs, slender, raised on both surfaces, the lowest three pairs from the base, the others distant, all curving up towards the margin and interlooping; cross nervules lax, indistinct, reticulations fine, obscure. *Petioles* slender, 1.5-3

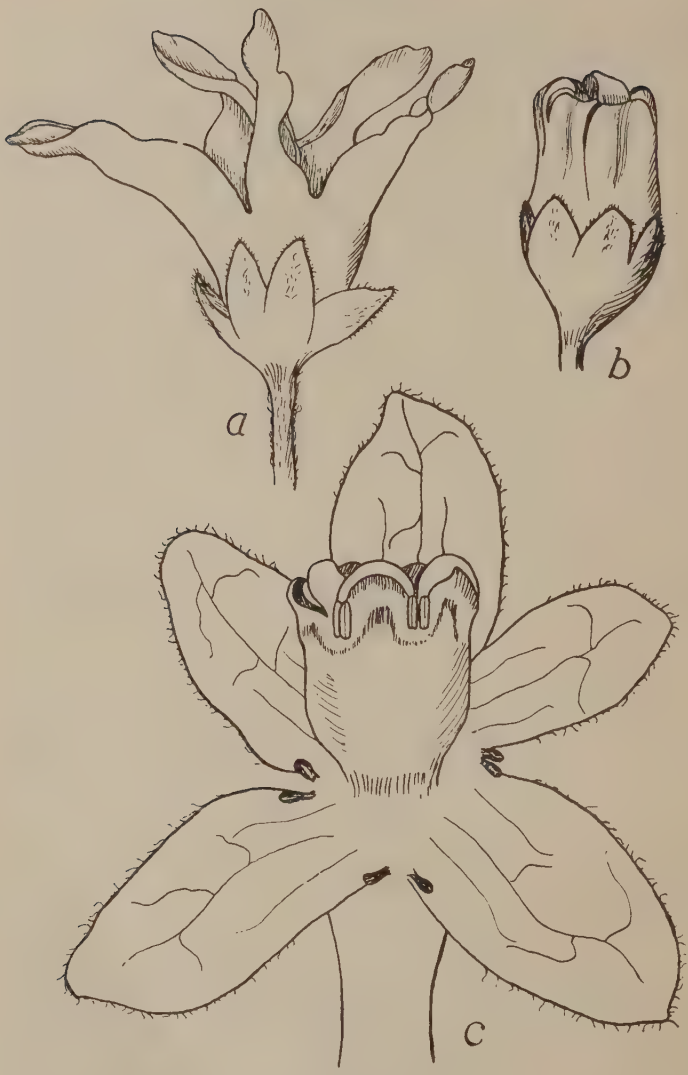

Fig. 2. Tylophora calcicola.

a. Expanded flower, x c. 10.

b. Flower bud, x c. 10.

c. Flower with petals removed and calyx flattened, showing staminal column, x c. 40.

cm. long, glabrous or sparsely pubescent. *Cymes* axillary, up to 3 cm. long, main peduncles slender, pubescent, up to 2.5 cm. long, usually with one or two short pubescent branches bearing rather dense umbellate clusters of up to about 10 flowers. *Pedicels* slender, pubescent, up to 6 mm. long. *Calyx* pubescent outside, lobes ovate lanceolate to ovate, subacute or blunt, up to 1 mm. long and 0.7 mm. broad, edges ciliate, glands minute. *Corolla* tube more or less oblong or obconic, c. 1 mm. long; buds oblong truncate with the upper parts of the lobes inflexed and bent downwards; in the opened flower the lobes 2.5-3 mm. long, rather fleshy, the basal part oblong, then suddenly contracted into a narrow oblong thickened tail caused by the margins becoming strongly recurved, the lower margins also becoming recurved in the older flowers, puberulous within. *Corona* processes shorter than staminal column, ovate globose, fleshy, somewhat concave and closely adpressed to the backs of the anthers; *anthers* broad with a short broad rounded appendage slightly exceeding the style apex; pollinia very small, narrowly ellipsoid, pale shining yellow, attached near the base by very short caudicles to the shining red brown pollen carrier. *Style-apex* pentagonal, top flattened, depressed. Ripe fruit unknown.

PAHANG: Bukit Cheras, about 15 miles W.N.W. of Kuantan, at base of limestone cliff, *Henderson 25204* (type); flrs. white, in October.

KELANTAN: Gua Ninik, near the railway line close to the Pahang boundary, on limestone, *Henderson 19583;* flrs. white, in October.

LOGANIACEÆ.

Fagraea calcarea, sp. nov. **(Plate XXVIII B).**

F. Curtisii, King et Gamble similis, sed foliis pro rata latioribus et tenuioribus, calyce bracteolisque maioribus, floribus plerumque solitariis raro ternatis differt.

A *climbing shrub*. *Branchlets* stout, pale, with prominent leaf scars, striate when dry. *Leaves* thinly coriaceous, up to 17.5 cm. long and 9 cm. broad, elliptic to broadly ovate or somewhat obovate, base rather long narrowed, apex rounded with a very short abrupt triangular point; both surfaces glabrous, greenish or greenish grey when dry, minutely rugulose; midrib distinct above, prominently raised below; *main nerves* up to about 8 pairs, very faint on both surfaces when dry but visible by transmitted light, curving up to form a loop c. 1 cm. from the margin, with a fainter loop nearer the margin, tertiary

nerves and a fine close reticulation also visible by transmitted light. *Petioles* up to 1.5 cm. long, sheathing at base. *Flowers* terminal, usually solitary but sometimes in threes. *Pedicels* stout, up to 1 cm. long but usually less than half this length. *Bracteoles* 2 pairs, the outer ovate or ovate lanceolate acute up to 3 cm. long, the inner ovate rotund, 2 cm. long. *Calyx* 3.5-4 cm. long, ovate, the tube very fleshy c. 1.5 cm. long, lobes 5 unequal, ovate rotund, very fleshy, up to 2.5 cm. long and 2.2 cm. broad, the inner lobes narrowed and auricled at base. *Corolla* coriaceous, 9-10 cm. long, funnel shaped, the tube narrow at base, much widened above, c. 5 cm. long; limb 9-10 cm. across, lobes 5, broadly ovate or elliptic, apex rounded, c. 5 cm. long and 3.5 cm. broad. *Stamen* filaments slender, attached to corolla tube 2.5 cm. from its base, free portion c. 4 cm. long, anthers oblong, blunt, c. 1 cm. long. *Ovary* narrowly cylindric clavate, glabrous, longitudinally fluted, narrowed into the style, which is slightly shorter than the stamens. *Stigma* broadly funnel shaped. *Fruit* unknown.

PAHANG: Bukit Chintamani, between Bentong and Karak, climbing on a limestone rock face, *Henderson 25036* (type); flr. white, in October.

Evidently allied to *F. Curtisii*, King and Gamble, but differs in the thinner, wider and more rounded leaves, in the flowers being usually solitary or sometimes in threes and somewhat larger, and in the much larger and more deeply cut calyx.

Fagraea Sparei, sp. nov. **(Plate XXVIII A).**

F. lanceolata, King et Gamble, Mat. Fl. Mal. Pen. iv, 607, non Blume; Ridley, Flor. Mal. Pen. ii, 420.

Frutex scandens. *Folia* ad 12-13 cm. longa, ad 5.5 cm. lata, coriacea, oblanceolata, basi cuneata, apice obtusa vel breviter obtuse acuminata, sicco brunneo-nigra; costa subtus prominente, nervis lateralibus obscuris, petiolo ad 1.5-2 cm. longo. *Calyx* oblongus, c. 2.3 cm. longus; lobi 1.3-1.4 cm. longi, oblongo-ovati rotundati. *Corolla* carnosa, ad 5.5 cm. longa et 4-5 cm. lata; tubus anguste infundibuliformis, 3.5 cm. longus; lobi ovato-rotundati, 2 cm. longi, 1.7 cm. lati. *Filamenta* c. 3 cm. longa, antheris oblongis, breviter acutis, 4-5 mm. longis. *Ovarium* anguste cylindricum, cum stylo 4.5 cm. longum. *Fructus* ovoideus vel oblongo-ovoideus.

A climbing *shrub*, ? epiphytic. *Branchlets* ashy brown when dry, bark smooth. *Leaves* up to 12-13 cm. long, 5.5 cm. broad, coriaceous, oblanceolate, the base narrowed, the apex blunt or with an abrupt blunt point; both surfaces blackish brown when dry, minutely rugulose, midrib faint

above, prominent below, *main nerves* very faint or invisible. *Petiole* stout, 1.5-2 cm. long, sheathing at base. *Flowers* apparently solitary, pedicel c. 1.5 cm. long, compressed, with a pair of lanceolate or ovate bracteoles c. 0.7-1 cm. long at apex. *Calyx* oblong, c. 2.3 cm. long, fleshy, lobes apparently not spreading, 1.3-1.4 cm. long, oblong-ovate, rounded. *Corolla* fleshy, about 5.5 cm. long and 4.5 cm. wide across the limb, tube 3.5 cm. long, c. 5 mm. wide at base, narrowly funnel shaped, lobes ovate rotund, 2 cm. long and 1.7 cm. broad. *Stamen* filaments inserted 1.6-1.7 cm. above base of corolla tube, free portion c. 3 cm. long, basal part thickened for about 7 mm., gradually tapering into the slender upper part; anthers 4-5 mm. long, oblong, shortly acute. *Ovary* and style 4.5 cm. long, the ovary narrowly cylindric, tapering into the rather stout style. *Fruit* ovoid or oblong ovoid, c. 1.5 inches in diameter (ex Ridley), crowned by the rather long fragment of style.

JOHORE: Sungai Tukong Estate, *Gordon Spare F 952* (type); flr. Sept. Kluang State land, *Forest Dept. 5849* (a fragmentary specimen, but probably this species).

PERAK: Maxwell's Hill, *Wray 3202;* Larut, *Kunstler 6848.*

This species is quite distinct from *F. lanceolata* Bl., as Ridley remarks in Flor. Mal. Pen. ii, 420. It does not appear to be at all common and only rather poor material of it has been collected.

GESNERACEÆ.

Paraboea Bakeri, sp. nov.

P. ferruginea, Ridl. affinis, sed indumento haud ferrugineo, breviore, nervis et reticulationibus subtus multo magis prominentibus, inflorescentiis brevioribus, laxioribus, sepalis quam corollam brevioribus differt.

A stemless *herb*, rhizome stout with copious slender roots. *Leaves* up to 7.5 cm. long and 5 cm. broad, ovate or orbicular ovate, blunt, usually abruptly narrowed to the minutely cordate or auricled base or the base rounded and sometimes unequal; margin crenate; texture thick; upper surface bullate in life, smooth when dry in the older leaves and minutely and densely white pubescent, lower surface closely glandular papillose between the reticulations; midrib and c. 7 pairs of *main nerves* impressed and somewhat faint above, very prominent below and thick, as are the reticulations, all covered with a dense pale brown or yellowish brown matted tomentum. *Petioles* up to 4.5 cm. long, stout, densely pale brown hairy. *Inflorescences* up

to 8 or 9 cm. long, peduncles, pedicels and sepals densely hirsute with long pale brown matted hairs, in fruit glabrescent; cymes lax, fewflowered, subumbellate. *Calyx* tube very short, sepals narrow triangular lanceolate acute, 3 mm. long. *Corolla* c. 7 mm. long and 6 mm. wide across the expanded lobes, tube 3.5-4 mm. long, narrowly campanulate, puberulous, 2-lipped, lobes orbicular, the largest 2.5 mm. long and broad. *Stamen* filaments inserted near the base of the corolla tube, minutely pubescent, curved, c. 2.3 mm. long. *Anthers* orbicular oblong, c. 1.9 mm. long and 1.2 mm. broad, very lightly coherent by their apices. *Ovary* oblong, 1.2 mm. long, shortly and densely pubescent, abruptly narrowed into the rather stout style which is 3 mm. long and stiffly white pubescent in its lower two-thirds. *Stigma* small, rounded. *Capsule* oblong or oblong conic acute, puberulous, c. 5 mm. long.

PAHANG: Bukit Sagu, about 18 miles N.W. of Kuantan, alt. c. 1000 ft., on bare dry limestone, *Henderson 25094* (type); flowers white with a faint pink tinge, in October.

Named after Mr. V. B. C. Baker, Sungai Lembing, Pahang.

Paraboea Bettiana, sp. nov.

P. laxa, Ridl. probabiliter affinis, sed caule longiore, foliis petiolatis cordatis, inflorescentiis brevioribus haud laxis, sepalis pubescentibus haud glabris differt.

Stem woody, up to 45 cm. tall, densely softly white hairy. *Leaves* membranous, more or less crowded towards the top of the stem, up to 12 cm. long and 7 cm. broad, ovate lanceolate to ovate, apex acute, base broad, shallowly cordate or rounded and often unequal, margin deeply and coarsely serrate and softly white hairy; upper surface sparsely softly long white hairy, lower surface more sparsely so; *main nerves* 6-7 pairs, faint above, slender but raised and distinct below with long spreading white hairs. *Petioles* slender, reaching 13-14 cm., softly white hairy. *Inflorescences* numerous, up to 18 or 20 cm. long, peduncles slender, up to c. 12 cm. long, strawcoloured, softly white hairy, becoming glabrous, dichotomously branched, usually twice, the branches rather strict. *Pedicels* slender, pubescent, up to 4.5 mm. long, bracts linear caducous, 1-1.6 mm. long. *Calyx* tube short, sepals linear oblong acute, pubescent, 2 mm. long. *Corolla* 4-6 mm. long, 4.5-6 mm. across expanded lobes, 2-lipped, the upper lip of 2 ovate blunt lobes 2.5 mm. long and 2 mm. wide, lower lip of 3 similar but smaller lobes granular-glandular within, tube 2-2.5 mm. long, obconic-campanulate. *Stamen* filaments inserted c. 1 mm. from base of corolla tube and decurrent on it to the

base, free portions curved, c. 1.5 mm. long. *Anthers* quadrate, about 1 mm. across, the pair filling the mouth of the corolla tube. *Staminodes* 2, slender, clavate, c. 1 mm. long. *Ovary* conic oblong, pubescent, about 1.1 mm. long, narrowed into the style. *Style* 1.3 mm. long, pubescent, not exceeding the stamens, stigma small capitate. *Capsule* 9-10 mm. long, pubescent, narrowly cylindric oblong, style persistent.

PAHANG: Bukit Cheras, about 15 miles W.N.W. of Kuantan, alt. c. 500 ft., at mouth of limestone cave in soil kept damp by drip, *Henderson 25250* (type); flowers lilac-mauve, in October; same locality, on wet limestone rock, *Henderson 25216*.

Apparently aberrant in *Paraboea* in the presence of staminodes, but the flowers are otherwise those of this genus.

This plant bears a striking superficial resemblance to *Boea minutiflora*, Ridl., also from limestone, but it can be distinguished easily by the cordate or rounded, not attenuate leaf bases, and the straight, not twisted capsules.

Named after Mr. D. Bett, Sungai Lembing, Pahang.

Paraboea floribunda, sp. nov.

Caulis erectus, ad 10 cm. longus. *Folia* opposita, 15 cm. longa et 6 cm. lata, elliptico-lanceolata, ovata vel obovata, apice acuta, basi minute cordata; supra glabra, subtus ad costam nervosque sparse pilosa, nervis lateralibus utrinque 13-14, pagina superiore impressis, inferiore prominentibus, margine crenata, petiolo ad 1 cm. longo, dense hirsuto. *Pedunculi* communi ad 9 cm. longi, sparse hirsuti. *Pedicelli* c. 6-10 mm. longi. *Sepala* c. 4 mm. longa, linearia, sparse pilosa. *Corolla* c. 1.5 cm. lata, late campanulata, lobis rotundatis. *Stamina* 2, filamentis 1.5 mm. longis, antheris late triangularis, c. 1-1.2 mm. longis. *Ovarium* cylindrico-conicum, tomentosum, c. 2.5 mm. longum. *Stylus* 3-4 mm. longus, curvatus, stigmate obscure bilobato. *Capsula* 1.5 cm. longa, anguste cylindrico-oblonga, angulosa, minute puberula.

Stem woody, tomentose, c. 10 cm. tall. *Leaves* more or less tufted at the top of the stem, opposite, 15 cm. long and 6 cm. broad, elliptic lanceolate, ovate or obovate, apex acute, narrowed to the minutely cordate or almost auricled, sometimes unequal base; margin crenate; upper surface glabrous, pale green but darker along the veins, minutely impressed dotted; lower surface pale with long sparse reddish hairs on midrib and main nerves; *main nerves* 13-14 pairs, impressed above, prominent below, cross nervules and reticulations distinct. *Petiole* up to about 1 cm. long, reddish pink, densely hairy. *Inflorescences*

numerous, peduncles up to 9 cm. long, reddish pink with rather sparse stiff whitish hairs, in the perfect inflorescence with 2 terminal flowers, of which the uppermost opens first, and 2 branches c. 1.5 cm. long, each again with 2 terminal flowers and 2 branches c. 0.6-0.8 cm. long which bear 1 terminal and 2 lateral flowers; inflorescences often reduced by suppression of one of the terminal flowers on the secondary branches or by partial or complete suppression of the tertiary branches; bracts narrow lanceolate c. 8 mm. long. *Pedicels* variable in length, up to 1 cm. long, sparsely white hairy like the bracts. *Sepals* linear, sparsely white hairy, c. 4 mm. long. *Corolla* c. 1.5 cm. across, broadly campanulate, distinctly 2-lipped, the broad rounded lobes nearly all of the same size, but the lower lip longer than the upper one, lobes lilac, tube slightly paler, sometimes with a number of darker lines in the throat. *Stamens* inserted near the base of the corolla on slight swellings, filaments stout, 1.5 mm. long, anthers broadly triangular, coherent at apices, c. 1-1.2 mm. long, connective broad and ridged. *Disc* a very short fleshy ring round base of ovary adherent to the sepals. *Ovary* green, white tomentose, cylindric conic, c. 2.5 mm. long, tapering into the rather stout curved 3-4 mm. long style. *Stigma* green, obscurely bilobed. *Capsule* narrowly cylindric oblong, angled, 1.5 cm. long, sparsely and minutely puberulous.

Described from living plants in cultivation.

KEMAMAN: Bukit Kajang, Sungai Nipah, *Corner 26022* (type).

Probably related to *P. Curtisii*, Ridl., and *P. obovata*, Ridl., but not similar to any other described species from the Malay Peninsula.

This is a most attractive and very floriferous plant not difficult to cultivate. One specimen grown in the Botanic Gardens, Singapore, had no fewer than 29 erect umbellately arranged inflorescences each bearing on an average about 10 faintly scented flowers. A fully developed inflorescence will bear 18 flowers, but usually a number of flowers are suppressed.

VERBENACEÆ.

Clerodendron hispidum, sp. nov. **(Plate XXIX).**

C. langkawiense, K. & G. probabiliter affinis sed ramis pubescentibus pilis longis, foliis multo latioribus, hispidis, petiolis longioribus, calyce maiore, tubo corollae multo breviore differt.

A *shrub* c. 1-1.5 metres tall. *Branchlets* terete, densely yellow hispid when dry, finely longitudinally ridged. *Leaves* chartaceo-membranous, up to 24 cm. long and 10 cm. broad, elliptic or oblong ovate, the broadest part occasionally above the middle, apex long acuminate, base rounded or very shallowly cordate or sometimes attenuate; margins rather irregularly sinuate dentate or almost entire, hispid; upper surface drying brown or blackish brown, lower usually paler, both hispid with rather sparse pale hairs which are dense on the midrib and main nerves; midrib distinct but not prominent above, bold below; *main nerves* 7-8 pairs, rather indistinct above, raised and distinct below, the basal pair usually at a more acute angle to the midrib than the others, the next 3 or 4 pairs usually almost straight than gently curving along the margin, the uppermost pairs emerging from the midrib more obtusely, often almost at right angles, then curving abruptly upwards; the looped intramarginal nerve usually indistinct; transverse nervules distinct below, distant, more or less horizontal, reticulations lax, rather faint. *Petioles* 3-8 cm. long, stout, densely hispid, often longitudinally ridged when dry. *Panicles* terminal, thrysoid, pyramidal, up to 25 cm. long, densely yellow hispid, bracts leaflike, progressively smaller from below upwards, branches 1.5-2.5 cm. apart, c. 1.25-2 cm. long, bearing rather densely flowered trichotomous cymes, the peduncles and pedicels with dense multicellular hairs, bracts and bracteoles long linear subulate. *Pedicels* c. 0.5-1.2 cm. long, occasionally shorter, thickened at apex. *Calyx* 10-11 mm. long, campanulate, lobes ovate lanceolate acute, 8-9 mm. long, outside with very long stiff multicellular hairs especially on the mid-rib, nerves and margin, glabrous within, 5-nerved. *Corolla* tube cylindric, slightly expanded at base, c. 13 mm. long, c. 2.7 mm. in diameter at base and c. 1.6 mm. near apex, scabrid puberulous outside except at base, shortly and sparsely glandular hairy within, lobes oblong ovate or somewhat obovate, rounded, subequal, c. 4.5 mm. long and 3 mm. broad, the midlobe of lower lip somewhat narrower than the others and subacute, glabrous within, densely hispid pubescent without. *Filaments* exsert, slender, glabrous, c. 13 mm. long, anthers ovate blunt c. 1.6 mm. long and 0.6-0.7 mm. broad. *Style* slender, glabrous, c. 20 mm. long, stigmatic lobes slender, subulate, tapering, c. 1 mm. long. *Ovary* rounded, glabrous, shallowly lobed. *Fruit* unknown.

PAHANG: in lowland forest near the limestone hill Bukit Sagu, Kuantan district, *Henderson 25085* (type); flr. October, corolla yellow, calyx red hairy.

MYRISTICACEÆ.

Horsfieldia bracteosa, sp. nov. **(Plate XXX).**

H. sucosa, Warb. affinis, sed foliis maioribus, panicula rufo-pubescentia, bracteis conspicuis, subpersistentibus, antheris paucioribus differt.

A *tree* c. 12-.3 metres tall. *Branchlets* stout, glabrous, pale grey brown, with raised longitudinal ridges. *Leaves* up to c. 28 cm. long and 8.5 cm. broad, lanceolate, ovate lanceolate or slightly oblanceolate, apex acute, base narrowed; both surfaces glabrous; when dry the upper usually blackish or greenish brown, the lower dull red brown or pale brown; margins revolute; midrib prominent below; *main nerves* up to 14 pairs, usually inconspicuous on the upper surface, distinct below, at first straight, then curving up to and along the margin, sometimes forming loops, transverse nervules few and very inconspicuous. *Petiole* stout, black, rugulose, bordered by the decurrent margins of the leaf blade. ♂ *flowers* numerous in branched panicles from axils of fallen leaves, up to 13 cm. long, the rachis black, flattened and finely longitudinally ridged when dry, minutely rufous pubescent, sparsely so on the older parts, densely on the ultimate branchlets; branchlets terminating in umbellate cymules of 3 flowers, each cymule subtended by a conspicuous subpersistent bract; bracts variable in shape, ovate blunt or lanceolate subacute, up to 3.2 mm. long and 1.8 mm. broad, rufous hairy on edges and black dotted. *Perianth* depressed globose, glabrous, c. 1-1.3 mm. long and 1.2-1.7 mm. broad, segments 3, glabrous within. *Pedicel* 1.1-1.2 mm. long, glabrous. *Androecium* shortly stipitate, broad depressed globose, anthers 7, connate for their whole length, their apices inflexed. ♀ *flower* and fruit unknown.

PAHANG: Tembeling, in lowland forest to west of railway station, on calcareous soil, *Henderson 24521* (type); flr. May.

Easily distinguished from other Malay Peninsular species of similar habit by its large conspicuous bracts.

LAURACEÆ.

Endiandra Holttumii, sp. nov. **(Plate XXXI).**

A *E. Kingiana,* Gamble foliis pro rata angustioribus, tenuioribus, glabris, paniculis longioribus, floribus maioribus distinguenda.

A *tree* c. 16-17 metres tall. *Branchlets* terete, glabrous, pale whitish grey or brown, longitudinally striate, youngest branchlets angled. *Leaves* chartaceo-coriaceous, up to 19

cm. long and 8 cm. broad, oblong lanceolate to elliptic, apex shortly acute, base cuneate; both surfaces glabrous, the upper shining brown when dry, the lower dull, paler; midrib somewhat impressed or flattened above, raised below; *main nerves* up to 12 pairs, distinct on both surfaces, raised below, almost straight at first then gently curving up to and along the margin, tertiary nerves irregular, the cross nervules distinguishable from but not more prominent than the fine areolate reticulations which are raised on both surfaces; *petiole* stout, black, rugose, up to 1.8 cm. long. *Panicles* dense, axillary or terminal, up to 7-8 cm. long, rachis golden pubescent; *pedicels* rather stout, red pubescent, c. 2 mm. long; bracts caducous; buds ovoid, bluntly pointed, rufous pubescent, 3.5 mm. long, 2.5 mm. wide. *Perianth* tube densely red pubescent, c. 1 mm. long, lobes fleshy, cream coloured in life, the 3 outer larger than the 3 inner, one outer lobe usually larger than the other two, 4 mm. long, 2.5 mm. broad, ovate oblong or ovate, blunt or subacute, margin thin, red pubescent, glabrous within except for a rufous granular glandular patch at base and a few rufous glandular hairs near apex and on midrib; inner lobes oblong lanceolate, more or less acute, 4 mm. long, 1.5 mm. broad, glabrous except at base or densely rufous granular glandular within; lobes reflexed in anthesis. *Stamens* 3, 2-2.2 mm. long, rufous glandular pubescent, thick, triangular conoidal, narrowing to just above anthers then widening to a broad triangular blunt point, connivent and enclosing ovary; *anther-cells* c. 1 mm. long, narrow, distant, immersed in the connective, lids curling upwards and outwards. *Ovary* pyramidal, 3-angled, c. 1.2 mm. long, glabrous; *style* very short, stigma blunt, rounded. *Fruit* unknown.

PAHANG: Sungai Tekal, between railway line and the Pahang river, on stream bank, *Holttum 24679* (type); flr. April.

A specimen in rather young bud collected at Rompin, Pahang by the *Forest Dept.* (*No. 17114*) is most probably referable to this species.

EUPHORBIACEÆ.

Sauropus calcareus, sp. nov.

Frutex parvus, glaber, multi-ramosus. *Folia* glabra, orbiculata, late oblongo-ovata vel ovata, apice rotundata vel minute emarginata, basi rotundata vel minute cordata, ad 3 cm. longa et 2.5 cm. lata, nervis lateralibus c. 6-jugis,

indistinctis, reticulationibus conspicuis, petiolo ad 1-1.5 mm. longo. *Stipulae* acutae, persistentes, ad 1 mm. longae. *Flores* ♂ : pedicelli capillacei, ad 8 mm. longi, apice incrassati; calyx ad 2 mm. latus, breviter 6-lobus; columna staminalis brevissima. *Flores* ♀ : pedicelli ad 2-3 mm. longi; calyx campanulatus, fere ad basin 6-lobus, lobis late obovatis, brevissime apiculatis. *Ovarium* subglobosum, trigonum, c. 1 mm. longum. *Capsula* depresso-globosa, c. 4.5 mm. diameticus.

A low much branched *bush*. *Branchlets* glabrous, bark black and winged, the youngest twigs brown and striate. *Leaves* thin, glabrous, alternate, orbicular, broadly oblong ovate or ovate, apex rounded or sometimes very slightly emarginate, base round or minutely and shallowly cordate, up to 3 cm. long and 2.5 cm. wide, upper surface pale greenish when dry, the lower more or less glaucous; *main nerves* about 6 pairs, faint on both surfaces, almost at right-angles to the midrib, straight, and interlooping at two-thirds of the distance to the margin, reticulations raised on both surfaces, thicker and much more prominent than the main nerves, especially towards the margin. *Stipules* very small, acute, persistent, up to 1 mm. long. *Petiole* short, 1-1.5 mm. long. ♂ *flowers* on very short densely bracteate axillary tubercles, bracts broadly triangular ovate acute, dentate, c. 1 mm. long, the inner ones narrower. *Pedicels* capillary, up to c. 8 mm. long, apex thickened. *Calyx* shallowly saucer shaped, c. 2 mm. in diameter, black when dry, scarlet in life, margin 6-lobed, the lobes broad and shallow and somewhat irregular, disc lobes 6, acute, prominent in the young flower and enclosing the staminal column. *Staminal* column very short and broad. ♀ *flower:* pedicel 2-3 mm. long, stouter than in the ♂ ; calyx campanulate or probably eventually saucer shaped, c. 1.9 mm. long and 1.5 mm. broad, when spread out c. 3.5 mm. across, 6-lobed nearly to base, lobes subequal, broadly obovate, shortly apiculate. *Ovary* sessile, subglobose, trigonous, c. 1 mm. long, styles 3, adnate to top of ovary for almost all their length, only the bifid recurved tips free. *Capsule* somewhat depressed globose, c. 4.5 mm. in diameter, black when dry, seeds straw coloured.

PAHANG: Gunong Senyum, on limestone, alt. low, *Henderson 22316* (type) ; flr. and fruit July.

Very distinct in its pale round leaves with their conspicuous reticulation.

Richeriella malayana, sp. nov. **(Plate XXXII).**

Ab *R. gracili,* Pax & K. Hoffm. foliis maioribus, pro rata angustioribus, inflorescentiis ♂ multo longioribus,

multiramosis, floribus pedicellatis, staminibus leviter longioribus, antheris brevioribus; inflorescentiis ♀ longioribus, ramosis, differt.

A *bush* or *small tree* c. 3-4 to c. 13 metres tall, glabrous. *Branchlets* terete, pale when dry, finely longitudinally striate and densely lenticellate. *Leaves* 15-28 cm. long, 4-10.5 cm. broad, lanceolate, oblong lanceolate, elliptic oblong or somewhat obovate, apex acuminate, base narrowed or rounded, margin recurved and somewhat wavy; midrib distinct above, prominent below; *main nerves* 11-13 pairs, fine but distinct and slightly raised above, raised and conspicuous below, curving up and interarching c. 0.5 cm. from the margin, with 2 further series of subsidiary loops nearer the margin; secondary nerves and cross nervules raised and distinct on both surfaces, reticulations fine but distinct. *Stipules* ovate lanceolate acute, c. 2.5-3 mm. long, peltately attached, early caducous and leaving rather conspicuous circular scars. *Petioles* stout, c. 5 mm. long. *Staminate inflorescences* up to 18 cm. long, usually from lower leaf axils but occasionally from upper ones, much branched, the secondary branches reaching 10 cm. in length, the tertiary ones up to 6 cm., all slender, flattened and striate when dry; flowers in dense glomerules from 4-10 mm. apart, up to about 8 flowers in each glomerule; bracts broadly triangular ovate acute, c. 0.7 mm. long and 0.5 mm. broad, strongly keeled on back; young buds sessile, mature flowers with a stout ridged pedicel c. 1 mm. long; *sepals* broadly ovate blunt to orbicular, concave, c. 1-1.2 mm. long, c. 1 mm. broad, margin at apex minutely irregularly dentate, aestivation quincuncial; *stamen* filaments slender, c. 2.2-2.5 mm. long, broadened at base; anthers broadly oblong ovate, c. 0.4-0.5 mm. long and 0.3-0.4 mm. broad; *disc* glands fleshy, broadly obconic truncate, c. 0.2 mm. long; *rudimentary ovary* oblong, c. 1 mm. long, cleft to below middle into 2 subulate recurved arms. ♀ *flowers* unknown. *Pistillate inflorescences* in fruit reaching c. 6 cm., often branched but not so much as the staminate inflorescences, fruiting pedicels slender, up to 2.5 cm. long; calyx persistent, of 5 triangular ovate acute reflexed lobes c. 0.8-1 mm. long and 0.6-0.7 mm. broad. *Capsule* c. 5 mm. long and 1 cm. broad, much flattened vertically, black when dry and reticulate, trilobed, dehiscent into bivalved cocci, leaving a persistent axis, seeds 2 in each coccus.

PERAK: Gunong Pondok, at base of limestone cliff, *Henderson 23790* (♂ type); ♂ flrs. June; Tambun limestone cliffs, near Ipoh, *Burkill 6281*, ♂ flr. Sept.; Padang Rengas, *Burkill 13561*, ♂ flr. June.

PENANG: Road to Balik Pulau, *Curtis 2463*, ♂ flr. July; Balik Pulau, *Ridley 9396* (type of fruit), fruit July.

PAHANG: Sungai Tawar, Pulau Tioman, *Burkill 1029*, ♂ flr. June; Pulau Tioman, *Kloss sine num.*, ♂ flr. June.

?MALACCA: *Cantley's collector 2247;* fruit Sept.

Cantley's collector gives the Malay name *Pokok Surangkeng*, and notes that it is used for rafters and firewood. The plant is usually a bush or a small bushy tree, but may reach 40 feet (fide Curtis). The male flowers are usually green, but Curtis notes them as white.

The genus *Richeriella* was erected by Pax and K. Hoffmann in Engler, Pflanzenreich 81 (1922) 30 for a plant described by Merrill under the name *Baccaurea gracilis* from Palawan, Philippine Islands, and hitherto has been known only from this locality.

The specimens quoted above were found to have been distributed doubtfully between the following genera in the herbaria at Kew and Singapore:—*Antidesma*, *Actephila* and *Kunstlerodendron* (Euphorbiaceae) and *Maesa* (Myrsinaceae).

Aporosa microstachya, Muell. Arg. in DC. Prodr. xv, 2 (1866) 474; Pax & K. Hoffm. in Engl. Pflanzenreich Euphorb.-Phyllanthoid.-Phyllanth. (1922) 102.

NEGRI SEMBILAN: Gunong Tampin, *Goodenough 1895*, *Burkill 3159*. Distrib: Burma, Mergui, Tongkah.

Aporosa selangorica, Pax & K. Hoffm. in Engl. Pflanzenreich Euphorb.-Phyllanthoid.-Phyllanth. (1922) 105.

PERAK: sine loc., *Scortechini sine num.*

SELANGOR: Ulu Gombak, *Burn-Murdoch 119*, *Symington C. F. 20501*, *Sanger-Davies C. F. 2279*, *Jaamat C. F. 11192;* Bukit Enggang, Kajang, *Symington C. F. 24137;* Dusun Tua, *Ridley sine num.:* Klang Gates, *Ridley 13385* (type).

PAHANG: Pulau Chengei, Pahang river, *Ridley 2288;* Tembeling, *Henderson 21773;* Jerantut, *Holttum 24748;* Gunong Senyum, *Henderson 22307*.

These two species are not included in Ridley's Flora of the Malay Peninsula.

Blumeodendron Tokbrai, J. J. S. in Mededeel. Dept. Landbouw, x (1910) 12, 460.

PERAK: Waterfall, Larut, alt. 300 ft., *Wray 3279;* fruit October.

PAHANG: Tembeling, *Henderson sine num.;* fruit May.

JOHORE: S. Sedili, *Corner sine num.* "Tree c. 60 ft. high in swamp jungle."

SINGAPORE: Reservoir jungle, *Corner sine num.;* fruit March.

A note by Sir George King on *Wray 3279* reads: "Sir Joseph Hooker doubts this being the true *Mallotus Tokbrai* of Blume."

Although the specimens quoted are in fruit only, there can be little doubt that they are correctly placed in *B. Tokbrai.* Wray's specimens were not taken up in the Flora of British India, and as they were preserved in the Wray Herbarium in Taiping they were presumably not seen by Ridley and not mentioned by him in his Flora of the Malay Peninsula.

Sumbaviopsis albicans, J. J. S. in Mededeel. Dept. Landbouw, x (1910) 12, 357.

PAHANG: Tembeling, in lowland forest to west of railway station, on calcareous soil, *Henderson 24526;* fruit May.

This plant has not hitherto been recorded from the Malay Peninsula. It is known from Sumatra, Java, Borneo and the Philippines.

Excoecaria oppositifolia, Griff. in Calcutta Journ. Nat. Hist., iv, 386; Hook. fil., F.B.I. v, 474.

PERAK: Gunong Pondok, alt. c. 200 ft., *Henderson 23794;* fruit June. Also collected by Scortechini, without locality, number or date, probably in Perak; this specimen was found in the Indian covers at Kew, which accounts for the fact that the species has not hitherto been recorded from the Peninsula. Distrib: India and Burma.

ZINGIBERACEÆ.

Alpinia Burkillii, Hend., in Gard. Bull. S.S., iv (1927) 55. This must be regarded as synonymous with **Alpinia pahangensis,** Ridl., Flor. Mal. Pen. iv (1924) 282, although the published descriptions would indicate some differences in the flower structure. The correct name for this plant is now **Languas pahangensis** (Ridl.) Hend.

LOWIACEÆ.

Orchidantha calcarea, sp. nov.

O. longiflorae, Ridl. habitu affinis, sed foliis pro rata angustioribus, floribus minoribus, staminibus quam petalis brevioribus, stigmatis irregulariter breviter dentatis differt.

A tufted plant with thick fleshy roots. *Leaves* lanceolate acute, margin wavy, up to 73 cm. long including petiole,

and up to 7 cm. wide, petiole c. 24 cm. long, channelled above and bordered by the decurrent margins of the blade, sheathing; midrib depressed above, prominent below, nerves and reticulations indistinct. *Flowers* in pairs, axillary. *Bract* c. 4.5 cm. long, sheathing, apiculate, greenish purple. *Calyx* tube c. 8 cm. long, white, faintly tinged pink, lobes c. 6 cm. long and 1.5 cm. wide, linear oblong apiculate, blackish purple, yellowish green at base, spreading, margins more or less revolute. *Petals* 2.8 cm. long, linear, long acuminate, white with a few reddish purple lines near the margin; lip c. 5.5 cm. long and 2.5 cm. wide, the claw dark purple, edges overlapping and enclosing the petals and stamens, when spread out c. 2 cm. wide; the limb obovate, creamy white, strongly rugose with raised rugulose veins running from the claw and becoming thicker and branched in the limb, the tip with a triangular sinus 1.4 cm. deep into which the very broad, raised and rugulose papillose midrib projects as a tapering smooth subulate point somewhat exceeding the lobes. *Stamens* c. 1.3 cm. long, pale cream colour, base of filament slightly dilate and purple, apex rounded blunt, anthers linear c. 7-8 mm. long; pollen grains oblong, rounded at both ends, sometimes somewhat reniform, smooth, white, semitransparent, 150-200 μ long and 75 μ wide. *Style* slender, white, c. 1.1 cm. long. *Stigma* fleshy, vulviform, with three obtriangular arms, the centre one 6 mm. long, the side ones 4 mm. long, margins involute, truncate and shortly and irregularly dentate at apex, purple on outer face, white with a purple rim within.

Described from living plants in cultivation.

UPPER PERAK: Lenggong, near the limestone hill Gunong Runto, abundant at one point, *Henderson 26023* (type). Plants were brought back alive to Singapore (Accession No. 72/30) in June 1930, but it was not until October 1932 that they flowered.

Although the flowers are striking by reason of the contrast between the deep purplish black of the sepals and the creamy white of the lip, they are not conspicuous, being borne at ground level and hidden by the leaves. They have rather an unpleasant odour.

This species can be distinguished at a glance from both the other Peninsular species—*O. longiflora*, Ridl. and *O. maxillarioides*, Ridl.—by its relatively narrower leaves, long narrowed and decurrent on the petiole and by the distinctly wavy margin of the blade.

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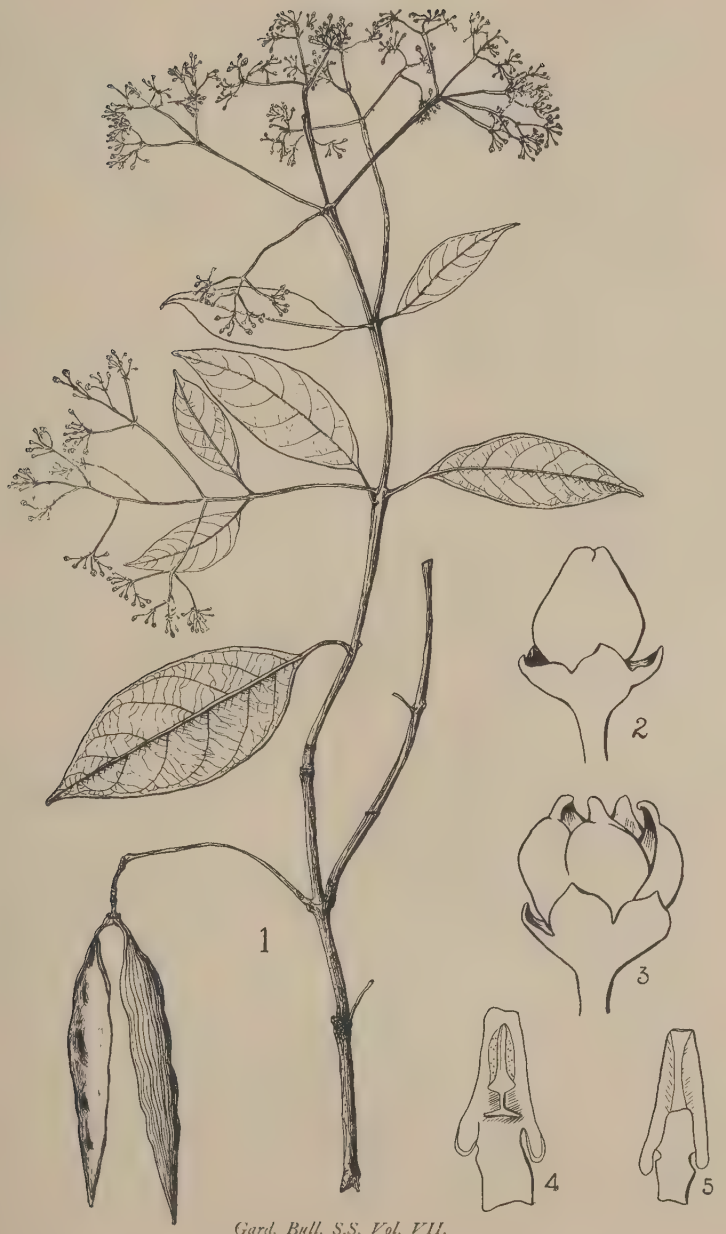

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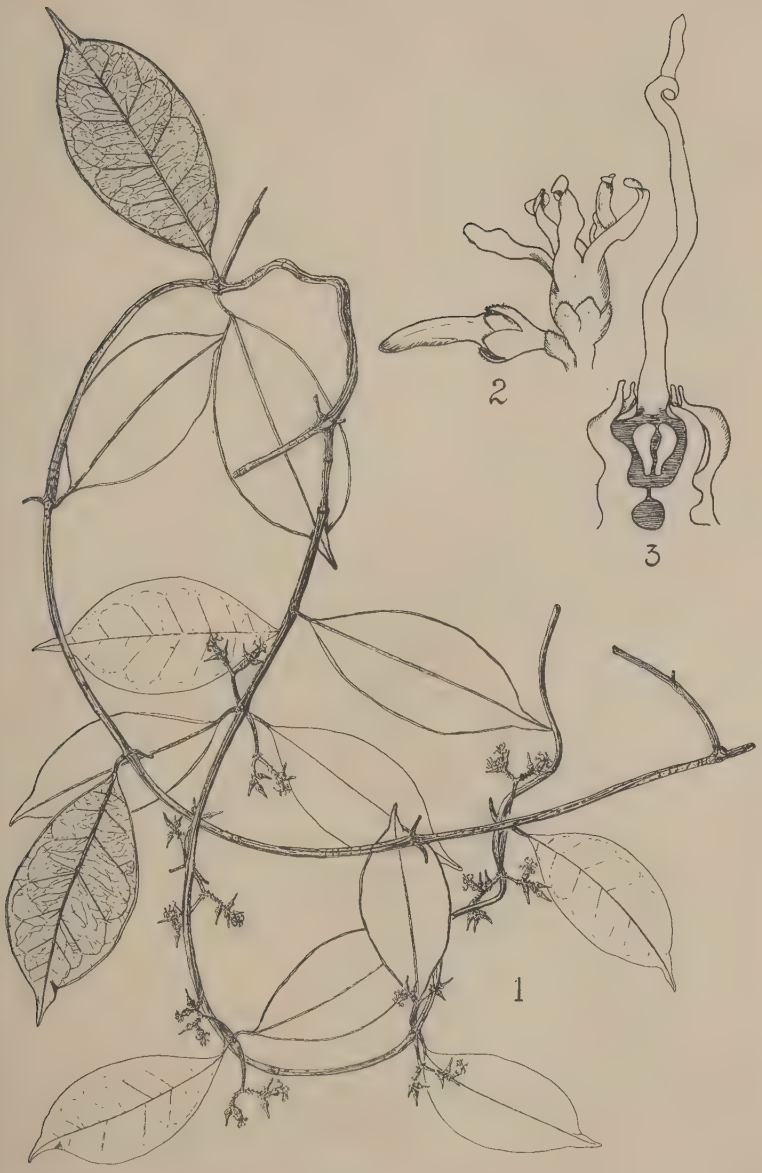

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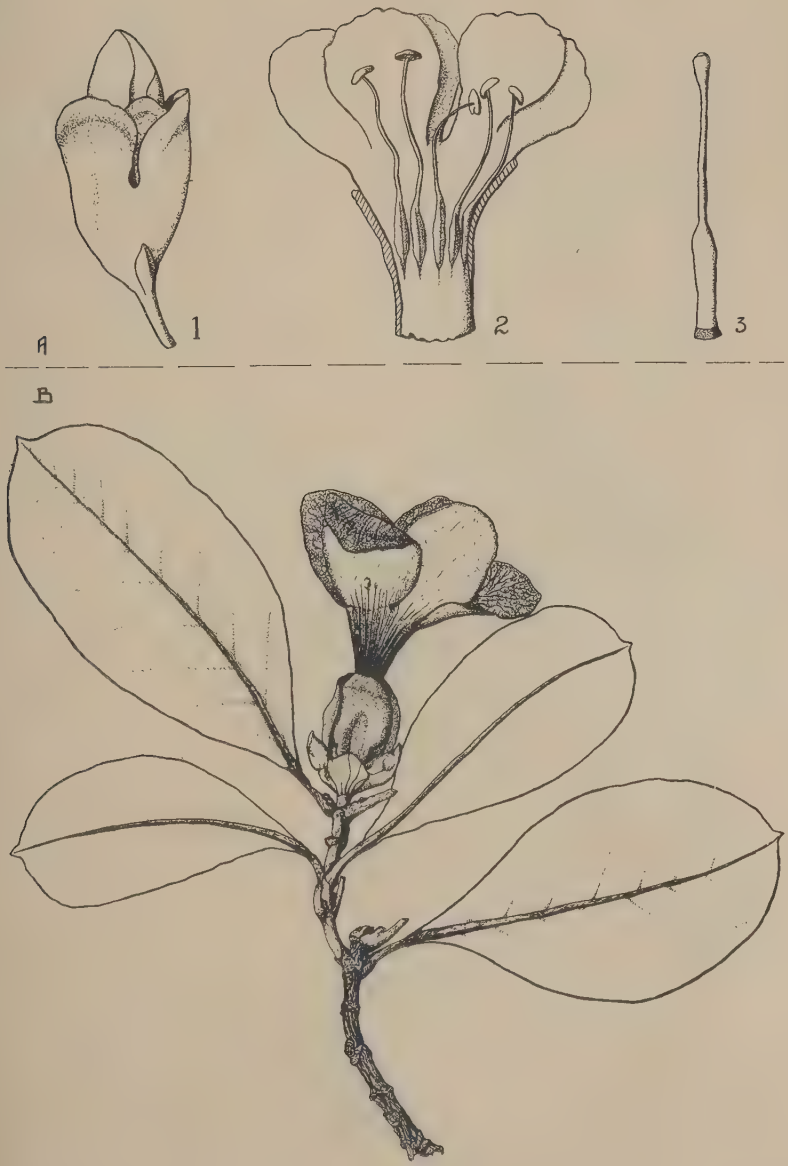

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Notes on Malayan Dipterocarpaceae—I.

By *C. F. Symington*, B.Sc., Asst. Forest Research Officer, Malayan Forest Service.

For some months during 1932, by the courtesy of the Director of the Royal Botanic Gardens, Kew, I had the opportunity of studying the *Dipterocarpaceae* in the herbarium there. Examination of the type material reveals the necessity for re-adjustment of our conception of the botanical status of some of our trees and considerable reduction to synonymy with the consequent alteration of some of the accepted names.

I am dealing in this number mainly with some of our species of *Shorea* but include also *Balanocarpus multiflorus*, which is more closely related to a group of Shorea including *S. Faguetiana* and *S. hopeifolia* than to some of the other species of its genus, and has therefore been studied here.

With the synonymy I have given any references to literature or iconography affecting the argument or which may help to a clearer understanding of the species through description or figure. In many cases I have added short descriptive notes which seem to me desirable for a more complete understanding of the botanical characters of the species. The concluding paragraph of the notes under each species is for the benefit of Malayan Forest Officers who are concerned less with the details of synonymy than a botanical name for the trees they meet in the jungle.

The majority of the drawings of leaves and inflorescence are by Mr. Wong Sze Moy of the Forest Research Institute, Kepong. The drawings of the flower parts I have done myself.

I am particularly grateful to Mr. Henderson of the Herbarium, Singapore, for assistance in the publication of these notes and to Dr. van Slooten of Buitenzorg for most generously lending me valuable type sheets.

Shorea Hemsleyana, King, MSS. in herb. Calcutta; Foxworthy, Mal. For. Rec. 10 (1932) 167, in part: *Balanocarpus Hemsleyanus*, King, Journ. Asiat. Soc. Bengal, lxii, 2 (1893) 134, & Ann. Bot. Gdns. Calcutta, V, 2 (1896) 160, pl. 193; Brandis, Journ. Linn. Soc. xxxi (1895) 109: *Shorea grandiflora*, Brandis, l.c. 93; *Pachychlamys Hemsleyanus*, Ridley, Flora Mal. Penin. I (1922) 234.—**Plate XXXIII.**

This species was first described by King in 1893 from several collections made in Penang and Perak (Curtis 2512;

King's Coll. 5431, 6670 & 7562; Scort. 1653). He described the plant as *Balanocarpus Hemsleyanus* but added a note upon the anomalous nature of the species which had flowers more like those of a *Shorea*. In 1922 Ridley placed the species in the genus *Pachychlamys*, a genus named in manuscript by Dyer. Foxworthy in 1932 removed it to the section *Brachyptera* of the genus *Shorea* where it is most happily placed. I am reducing to synonymy with this, *Shorea grandiflora* described in 1895 by Brandis from a Bornean collection of Haviland No. 2121. There is no doubt whatever of the identity of these species although Hav. 2121 has flowers above the average size of those in our collections and has a more hairy ovary. In King's original description of *B. Hemsleyanus* he says, "Ovary elongate-conic, tomentose, tapering into a sparsely puberulous style" but Brandis and Foxworthy describe the ovary and style as glabrous and Ridley omits to mention it. Actually the ovary and style are quite glabrous in young buds but as the flower develops a fine silky pubescence appears as a ring around the upper portion of the ovary and may extend to the style.

Foxworthy's conception of the species (Mal. For. Rec. 10, 167) is not clear as he has included under *S. Hemsleyana* all our collections of *Shorea macrantha*, Brandis, a closely allied but quite distinct species. His description however is evidently based upon authentic material of *Shorea Hemsleyana* but the following addition might be made—The flowers may be as much as 1.8 cm. long. The three rows of stamens are not always evident, the two shorter rows sometimes being almost equal. The filaments are many times longer than the anthers and the connectival appendages, erect in youth and curved or deflexed in age, are about twice as long as the anthers. The ovary is glabrous in youth but becomes silky pubescent as it matures.

Collections examined—

PENANG: Curtis, 2512.

PERAK: King's Collector, 5431, 6670 & 7562; Scortechini 1653; C.F. 12001, 12002, 12018 and 12019.

BORNEO: Haviland 2121 (Type of *S. grandiflora*, Brandis).

This tree is probably not well-known to Malayan Forest Officers as all the collections in the F.R.I. Kepong are exclusively from Parit reserve in Kinta district where it is known as *chengal pasir*. With the reduction of *S. grandiflora*, Brandis to synonymy we have now to record this species also from Borneo.

Shorea macrantha, Brandis, Journ. Linn. Soc. xxxi (1895) 97; *Shorea Hemsleyana,* Foxworthy, Mal. For. Rec. 10 (1932) 167, in part, not of King.—**Plate XXXIV.**

This species was described by Brandis from a flowering collection No. 2119 of Haviland from Borneo. There is a close similarity between this species and *Shorea Hemsleyana,* King both in flower and fruit and Foxworthy has included our collections along with authentic material of the latter species. Brandis placed the species in the Section *Pinanga* but his judgment was based on the evidence of flowering material only. Fruiting collections show clearly that the species belongs to the Section *Brachyptera* as conceived by Heim.

It is possible to amplify considerably Brandis' description with the material now available.

Medium sized trees; young branches stout, covered with a dense tawny stellate tomentum. *Leaves* coriaceous, elliptic oblong, shortly abruptly acuminate, slightly inequilateral, base cordate or truncate; upper surface brown glabrous shining except along the densely tomentose midrib; lower densely ferruginous or tawny stellate tomentose or scabrid; margins slightly revolute; secondary nerves 12–17 pairs, anastomosing at the margins, inconspicuous above, prominent beneath; tertiary nerves parallel, prominent beneath; size of mature leaves very variable, 6–18 cm. long by 3–7 cm. broad; petiole up to 7 mm. densely tawny tomentose; stipules sub-falcate, persistent, tawny tomentose, broad at base, acute at apex, 5-nerved. *Panicles* axillary and terminal, racemose, up to 12 cm. long, branches short distichous each subtended by two persistent stipular bracts, all tawny tomentose; flowers 2–5, fascicled on the short branchlets, each subtended by two small more or less persistent bracts, sessile. *Sepals* 5 mm. long ovate acute stellate tomentose without, glabrous within, three rather larger than the other 2. *Petals* linear up to 2.9 cm. in mature flowers, glabrous inside, tomentose along one half outside (said to be "red and white"). *Stamens* 15 in 3 rows; filaments broad and flattened at base, those of the smallest row about 4 times as long as the anthers; appendage to connective 1–2 times as long as the anther, filiform, erect in bud becoming curved or deflexed in age. (The appendages of the largest row of stamens are usually relatively smaller than those of the other rows and are often obscured beneath the anthers in mature flowers). *Ovary* glabrous or minutely sericeous puberulous in mature flowers, narrowing into a glabrous filiform style 2–3 times as long as the ovary. Stigma deltoid. *Ripe fruit,* oblong apiculate, tawny tomentose, up to 5 cm. long by 2 cm. broad. Persistent sepals nearly equal, bases thickened woody,

slightly rugose and tawny puberulous, 2 cm. long by 1.5 cm. wide, forming a cup which embraces the lower portion of the fruit.

We have several collections of this tree from Pahang which are distinct from other collections in having leaf nerves depressed on the upper surface to give a quilt-like appearance and in that the lower surfaces of the leaves are scabrid rather than tomentose, but I can detect no essential differences in this form.

Comparison of S. macrantha, Brandis and S. Hemsleyana, King. There is a very close similarity between these species but *S. macrantha* may easily be distinguished by the smaller, more oblong, inequilateral leaf and shorter petiole and, in flower, by the long linear corolla lobes.

Collections examined—

PERAK: Singapore 13247; C. F. 0314, 1241, 8050, 8808, 9722, 9751, 10260, 10290, 10460, 10493, 10810 and 27805.

PAHANG: C. F. 3553, 15039, 15684 and 15751.

BORNEO: Haviland 2119 (Type of *S. macrantha*, Brandis).

This also appears to be a tree of comparatively restricted distribution and therefore probably not well-known to many Malayan Forest Officers. Our collections are all from flat land either in Perak where the tree is known as *chengal pasir* or from Pahang where it is known as *kepong hantu.* The occurrence of this tree in the same locality and under the same vernacular name in Perak as *Shorea Hemsleyana* is probably responsible for its confusion with that species.

Shorea rugosa, Heim, Bull. Soc. Linn. Paris (1889) 973; Brandis, Journ. Linn. Soc. xxxi (1895) 96: *Shorea verrucosa,* Dyer, MSS. in herb. Kew: *Shorea* sp., Foxworthy, Mal. For. Rec. 3 (1927) 37, with two plates: *Shorea uliginosa,* Foxworthy, Mal. For. Rec. 10 (1932) 210 and 277.—**Plate XXXV.**

The type material of *S. rugosa,* Heim was collected in Borneo by Beccari between 1865 and 1868. These collections (Becc. 2638 and 2890) do not show the cupping of the leaves seen in the type of *S. uliginosa,* Foxw. but the flower structure and texture of parts is absolutely identical.

In briefly describing this material Brandis says that the stigma is tri-partite but in all flowers I have examined the stigma has been small and either simple or minutely papillose. Otherwise Brandis' description agrees with that of Foxworthy for *S. uliginosa* to which I have little to add except that the cupping of the leaves is by no means always

evident in herbarium material; the sepals are unequal, the two inner being half the size of the three outer; the stamens are of three sizes, two relatively short rows and one long, and the connectival appendage of the smaller stamens becomes deflexed only as the flower matures.

Collections examined—

PERAK: C. F. 17065, 27803, 27819 and 27831.

SELANGOR: C. F. 0432, 3263, 7938 (Type of *S. uliginosa* Foxw.), 11001, 21968, 23228, 24865, 27065, 27696, 27872, 28381, 29051, 29052, 29053, 29059, 29060, 29101, 29102 and 29103.

BORNEO: Beccari 2638 and 2890 (Types of *S. rugosa,* Heim), Haviland 2252.

This tree is our common cup-leaved form of *meranti bakau* found in freshwater swamp. Dr. Foxworthy's name of *Shorea uliginosa* is here reduced to synonymy with *S. rugosa,* Heim from Borneo.

Shorea platycarpa, Heim, Bull. Soc. Linn. Paris, ii (1891) 956: *Shorea nigrescens,* Dyer, MSS. in Herb. Kew: *Shorea leprosula,* Boerl., Cat. Hort. Bog. (1899) 110, not of Miquel: *Shorea palustris,* Ridl., Fl. Mal. Penin. I (1922) 224; Foxworthy, Mal. For. Rec. 10 (1932) 212.—**Plate XXXVI.**

Heim's original description was drawn from a Bornean collection of Beccari (3302) bearing very young fruit. Ridley's type of *S. palustris* (C. F. 2073) has vegetative parts which are absolutely identical and fruits which are nearly mature. I have felt more confident in identifying Ridley's species with that of Heim after examining a Bornean collection of Haviland (2252) which was included under the *Shorea leprosula* cover at Kew. This bears flowers which are identical in every way with those from our collections from the peninsula.

The flower of this species has been described by Foxworthy from C. F. 0310. On his description I should like to comment that in none of the flowers examined have I found any trace of scabrities on the awns which, as in *S. rugosa,* Heim, *S. lepidota,* Bl. etc. are at first erect but later become deflexed. Also the stigma is distinctly deltoid. This is an important point as it seems to be one of the few essential differences between the flowers of this species and those of the two just mentioned.

Collections examined—

DINDINGS: C. F. 2329 and 27842.

PERAK: C. F. 14373, 24601, 24615, 27801, 27808, 27823 and 29064.

SELANGOR:	C. F. 0310, 2073 (Type of *S. palustris*, Ridl.), 2920, 15310, 15337, 17043, 17044, 17045, 27063, 29058 and 29705.
PAHANG:	C. F. 6657, 15677 and 20131.
JOHORE:	C. F. 2372.
SINGAPORE:	S'pore 406 (Cult. in Econ. Gdns.).
JAVA:	Herb. Bog. 233 (Cult. in Hort. Bog. VII–B–40).
BORNEO:	Beccari 3302 (Type of *S. platycarpa*, Heim); Haviland 2253; C. F. 28695 (Brunei).

This is the tree frequently known to Malays as *meranti kait-kait, meranti paya* etc. or has been referred to as "the round-leaved form of *meranti bakau*" (vide Foxworthy).

Shorea Teysmanniana, Dyer, ex Brandis, Journ. Linn. Soc. xxxi (1895) 100: *Shorea cochinchinensis*, var *oligoneura*, Boerl., Cat. Hort. Bog. (1901) 107: *Shorea paludosa*, Foxw., Mal. For. Rec. 10 (1932) 277.— **Plate XXXVII.**

The species was originally described in 1895 by Brandis from a sterile collection of Teysmann from Bangka. The unsatisfactory type specimen consists of a twig with six rather immature leaves and two buds, and it is not surprising to find that it has been overlooked by subsequent authors. The species next appeared as a fruiting collection from a tree in the Buitenzorg Gardens which was catalogued by Boerlage as *S. cochinchinensis*, var *oligoneura*. In 1932 Foxworthy described his *S. paludosa* from a fruiting collection identical with Boerlage's specimen. Haviland's collections Nos. 2255 (flower and fruit) and 2330 (flower) are the only flowering specimens I have seen.

That the above are all identical there can be no doubt. A very distinctive vegetative feature which is evident in Brandis' original type and in every other collection I have examined, is the presence of long-stalked vegetative buds.

The fruit of this species has been described by Foxworthy. The following flower description is drawn from Haviland 2255. Unfortunately when examining the specimen I omitted to make complete notes on the nature of the inflorescence.

Flowers sessile, 7 mm. across when expanded. *Sepals* ovate, acute, tomentose outside and glabrous within, three large and two smaller, the largest about 2 mm. high. *Petals* oblique oblong 6 mm. long by 1.5 mm. broad when expanded, tomentose along one side without, glabrous within.

Stamens 15 in 2 rows, the larger, of five stamens, twice as long as the smaller; filaments several times longer than the anthers, flattened, and much expanded at the base; appendage to connective of large stamens a minute awn which becomes curved and deflexed in age; appendage of smaller stamens 2–3 times as long as the anthers, at first erect, later curved. *Ovary* about 1 mm. long consisting of a lower glabrous portion and an upper finely tomentose, ridged, conical portion tapering into a style as long as the ovary and glabrous above; stigma enlarged and disc-like.

Collections examined—

SELANGOR:	C.F. 3264, 23229, 23939 (Type of *S. paludosa* Foxw.), 24566, 24567, 27064, 27069 and 29054.
BANGKA:	Teysmann (Type of *S. Teysmanniana*, Dyer) and Herb. Bog. 6591.
JAVA:	Herb. Bog. 229 (VII-C-25 in Cat. Boerl.-authentic specimen of *S. cochinchinensis* var *oligoneura*, Boerl.).
BORNEO:	Haviland 2255 and 2330.

This is the swamp tree which has been collected in the Peninsula only from Kuala Langat and Telok Reserves in Selangor where it is known as *meranti bunga*. It is here shown to be not a "new species" but one described by Dyer in 1895 as *Shorea Teysmanniana*.

Shorea lepidota (Korth.) Blume, Mus. Bot. ii (1852) 32; Brandis, Journ. Linn. Soc. xxxi (1895) 96; not of Foxworthy, Mal. For. Rec. 10 (1932) 166: *Vatica lepidota*, Korth., Verh. Nat. Gesch. Bot. (1839) 73: *Vatica* ? *stipulosa*, Miq. Fl. Ind. Bat. Suppl. (1860) 486: *Shorea* ? *nitens*, Miq. l.c. 488: *Shorea stipulosa*, Burck, Ann. Jard. Buit. VI (1887) 220: *Shorea megistocarpa*, Foxw., l.c. 216, Pl. xvii.—**Plate XXXVIII.**

This species was first described from fragmentary flowering material from Sumatra by Korthals in 1839 as *Vatica lepidota*. In 1852 Blume referred the plant to *Shorea*. In 1860 Miquel, with a sterile Sumatran collection of Teysmann's described his *Vatica* ? *stipulosa* which in 1887 was referred to the genus *Shorea* by Burck. Contemporaneously with his description of *V. stipulosa*, Miquel published his *Shorea* ? *nitens*. He evidently failed to identify these as one species because the type of *V. stipulosa*

represents the immature stage with long leaf and woolly stem rather different from the more mature stage represented by *S. nitens*.

Brandis made the reduction of *S. nitens* Miq. to *S. lepidota*, Bl. in 1895. He also states that "*S. stipulosa* Burck (= *V. stipulosa*, Miq.) may possibly belong to this species." With the material of this species now at our disposal it is possible with confidence to remove the doubt from his statement.

Van Slooten ex Heyne in Nutt. Plant. Ned. Ind. 2nd edit. (1927) 1121 gives *S. aptera*, Burck, *S. palembanica*, Miq., *S. nitens*, Miq., *S. stipulosa*, Burck, *V. lepidota*, Korth. and *V. stipulosa*, Miq. as synonyms of *S. lepidota*, Bl., but is mistaken in uniting the first two with the others. *S. palembanica* Miq., to which is reduced *S. aptera*, Burck, (see notes on *S. palembanica*, Miq.), is the tree described by Foxworthy under *S. lepidota*. It grows along stream banks and has large, short-winged fruits which are valued for their fat. *S. lepidota* (Korth.) Bl., to which the others are reduced is the quite distinct tree described by Foxworthy as *S. megistocarpa*. It has a fruit of the usual long-winged type of *Shorea*. The types of *V. lepidota* Korth., *V. stipulosa* Miq. and *S. nitens*, Miq. are superficially not unlike collections of *S. palembanica* but may be distinguished by the narrower and more oblong leaves, the somewhat shorter and more delicate petioles, the slightly flattened branchlets and the large, long-persisting, subfalcate papyraceous stipules. The type of *V. lepidota*, Korth. consists of an immature twig and a twig with peduncles which bore very young fruit all of which have fallen except on the Buitenzorg sheet. This sheet which retains three young fruit and exactly matches C.F. 636 provides the key to the identity of *S. megistocarpa*, Foxw. with *S. lepidota*, (Korth.) Bl. The type of *V. stipulosa*, Miq. consists of sterile twigs from a seedling or sapling with long, short-petioled leaves, a woolly stem and large persistent stipules. Once recognised seedlings of this species are easily distinguished. The type of *S. nitens*, Miq. is a sterile mature twig and finds an almost exact match in C.F. 26050 and others.

This tree (*S. lepidota* (Korth.) Bl.), then, is that which Foxworthy has described as *S. megistocarpa*. He has fully described the species but I should like to add the following notes—

Sepals unequal, the two inner only half the length of the three outer: *Petals* linear-oblong when fully expanded, up to 8 mm. long: *Stamens* of two heights, the five inner twice the height of the ten outer; filaments tend to be

hollowed out from the posterior as in *S. gibbosa*, appendage to connective of large stamens about as long as the anther, that of small stamens about twice as long as the anther. In young buds all appendages are erect but as anthesis approaches first those of the posterior row of stamens become deflexed and later the remainder also. *Ovary* is finely pubescent. (This is one of the few floral distinctions between *S. lepidota* and *S. rugosa*. In the latter the ovary is densely tomentose).

Collections examined—

KEDAH:	C.F. 11465 and 12219.
PERAK:	C.F. 8339, 12981, 24647, 25551 and 27225.
NEGRI SEMBILAN:	C.F. 636 and 23349.
TRENGGANU:	C.F. 26701, 26892 and 26936.
PAHANG:	C.F. 1292, 2395, 5435, 6661, 6827, 8110, 10611, 13773, 23877, 24373, 26042, 26050, 26504, 26518 and 31507.
JOHORE:	C.F. 5893 (Type of *S. megistocarpa*, Foxw.) and 6012.
SUMATRA:	Herb. Utrecht 35913 (= Herb. Bog. 797 Teysmann (Type of *S. nitens*, Miq.), 35916 (= Herb. Bog. 2076) Diepenhorst (Type of *V. stipulosa*, Miq.), 3917 sine nota, 35918 Korthals (Type of *V. lepidota*, Korth) and 72529 (= Herb. Bog. 591) Teysmann; Herb. Bog. 589 Teysmann.

This is the large *meranti* found usually on low-lying land and known sometimes as *meranti pala*. It has been described as *Shorea megistocarpa* (vide Foxworthy l.c. 217) which is here shown to be identical with the older species *S. lepidota* (Korth.) Bl. by which name it must in future be known. The name *S. lepidota* is shown to have been misapplied to what is actually *S. palembanica*, Miq.

Shorea parvifolia, Dyer, in Hook. f. Fl. Brit. Ind. i (1872) 305; King, Journ. Asiat. Soc. Beng. lxii, 2 (1893) 112 in part; Brandis, Journ. Linn. Soc. xxxi (1895) 92; Foxworthy, Mal. For. Rec. 3 (1927) 31 with 2 plates; not of Foxworthy, Mal. For. Rec. 10 (1932) 199: *Shorea scutulata*, King, l.c. 110; Brandis, l.c. 102; Foxworthy, l.c. 201.—**Plate XXXIX.**

This species was first briefly described by Dyer from three flowering collections (2549, 1577 and 1197) made

by Maingay in Malacca. These were all given the Kew distribution number 206. In 1893 King amplified Dyer's description but from the fact that he says, "apiculus of connective very slender, about as long as the anther," I am inclined to think that he did not examine authentic flowering material of *S. parvifolia*, Dyer. Actually King cites Curtis 201 under *S. parvifolia*. It is a good flowering collection and was very probably examined by him but it is not *S. parvifolia*, Dyer but the closely related *S. ovata*, Dyer (See *S. ovata*). Had King examined authentic flowers of *S. parvifolia*, Dyer it is improbable that he would have redescribed the species as *Shorea scutulata*, King. I have examined flowers of Curtis 1396 from Penang, the type of *S. scutulata*, and also flowers from the types of *S. parvifolia*, Dyer and have no hesitation in uniting these species. King in his description of *S. scutulata* makes the statement that the anthers are inappendiculate and Brandis says of that species—"in bud I have invariably found a short pointed apical appendage." In my experience the appendage is invariably present although it becomes deflexed as the flower matures and is at least twice as long as the anther.

The plant referred by Foxworthy to *S. parvifolia* is actually *S. ovata*, Dyer. Foxworthy has given a full botanical description of this species under *S. scutulata* but I should like to make the following remarks—On each branchlet of the panicle there are usually 3–5 flowers, each about 7 mm. long. *Sepals* of two sizes, the three outer, broadly lanceolate ovate obtuse, are 2–3 times as long as the two inner which are ovate acute. *Petals* when mature, 3 times as long as the largest sepals. *Antherine appendage* at first erect, becomes deflexed in age. *Ovary* consists of a glabrous basal portion and a slightly ridged sericeous upper portion considered by Brandis to be a stylopodium. The style is about the same length as this stylopodium.

Among our numerous collections of this species there is a certain amount of variation. Collections from Kedah and Perak frequently have more elongate stipules than those from Selangor, and other collections, mainly from Pahang, have more oblong leaves which are more uniformly puberulous on the under surface. In the field also I have noted that the tree in Perak appears somewhat different from what I consider to be the same species in Selangor. However after careful examination of our herbarium material I must conclude that these variations do not constitute specific distinction. Moreover Dyer's type collections are not all identical. 2549 is typical of the form found in Selangor while 1577 and 1197 represent the Pahang form.

These minor differences may therefore reasonably be considered within the range of variation of the species.

Comparison of S. parvifolia, Dyer with S. ovata, Dyer. These two species are so very much alike that an enumeration of the essential differences may be useful. The trees are less likely to be confused in the field than in the herbarium because *Shorea parvifolia* is typically a tree of the plains while *S. ovata* is exclusively a hill form rarely seen below 1,000 ft. In the herbarium sterile specimens of *S. ovata* may be recognised by the typical ovate leaf of thicker texture and with a slightly longer petiole than *S. parvifolia*. Flowering specimens of *S. ovata* usually have more flowers on each branchlet of the raceme which are usually distichous as opposed to secund, but the only really reliable floral distinction is in the length of the antherine appendage. This in *S. ovata* is not more than the length of the anther while in *S. parvifolia* it is from 2–3 times as long as the anther.

Collections examined—

SIAM:	S'pore 24220, 24223 and 24335.
PENANG:	Curtis 1396 (type of *S. scutulata*, Dyer); S'pore 3465 and 3750; C.F. 25638 and 28044.
KEDAH:	C.F. 7597, 7608, 8901, 8911, 8979, 10054, 11466, 11469, 12226, 12597, 17753 and 17865.
PERAK:	C.F. 037, 038, 0131, 0133, 0117, 4554, 8305, 10370, 10395, 11025, 16340, 11026, 13223, 16635, 24493, 24603, 25438, 25585, 27802, 27818 and 28972.
SELANGOR:	C.F. 725, 739, 3337, 4658, 5712, 5791, 7064, 7911, 9543, 9544, 9550, 10897, 13261, 13954, 14907, 15263, 15358, 16475, 16489, 16906, 21374, 21961, 22070, 23098, 23124, 23125, 23126, 23127, 23128, 23852, 24886, 26351, 26385, 27895 and 28368.
NEGRI SEMBILAN:	C.F. 0610, 0611, 0621, 0630, 2007 and 23701.
MALACCA:	Maingay 1577, 1197 and 2549 (K.D. 206, Types of *S. parvifolia*, Dyer); C.F. 2015 and 2052.

TRENGGANU:	C.F. 26711.
PAHANG:	S'pore 24052; C.F. 1018, 1019, 1274, 1276, 1278, 4628, 4795, 4999, 5065, 5090, 5437, 5503, 5508, 5509, 6612, 8136, 8146, 10610, 10614, 14002, 15145, 17128, 23375, 23386, 23419, 26176, 28221 and 28313.
JOHORE:	C.F. 5856, 5862, 5966, 6014 and 6151.
SINGAPORE:	S'pore 634.

This is the tree usually known as *meranti sarang punai*, one of our most common softwooded Shoreas.

Shorea ovata, Dyer, ex Brandis, Journ. Linn. Soc. xxxi (1895) 91: *Shorea parvifolia*, King, Journ. Asiat. Soc. Bengal. lxii, 2 (1893) 112 in part; Foxworthy, Mal. For. Rec. 10 (1932) 199, not of Dyer in Hook. f. Fl. Br. Ind. i (1872) 305 and Brandis l.c. 92.—**Plate XL.**

The earliest cited collection of this species appears to be Curtis 201, Penang. This was included by King under *Shorea parvifolia* in 1893. In endeavouring to amplify Dyer's brief description of *S. parvifolia*, King apparently examined the best available flowering collection of what he considered to be that species i.e. Curtis 201 and described not the flowers of *S. parvifolia* but *S. ovata*. In 1895 Brandis published the first description of *S. ovata* using an MSS. name given by Dyer to a collection of Beccari (3092) from Borneo. Brandis cited also Haviland 2042 from which he gave an unsatisfactory description of the flowers of his species. He failed however to identify Curtis 201 with this species, presuming he saw the collection. Thus it is that King's error in including Curtis 201 under *S. parvifolia* has been responsible for the fact that *S. ovata* has never been recorded from the Peninsula, because subsequent authors have included our *S. ovata* material along with authentic collections of *S. parvifolia* under the last name. Foxworthy, however, has endeavoured to separate these species by confining the name *S. parvifolia* to what is actually *S. ovata* and considering the remainder as *S. scutulata*.

This species has been botanically described under *S. parvifolia* by Foxworthy but to his description I should like to add the following remarks—The flowers are more often distichously arranged than secund and there are usually 5–10 on each branchlet of the panicle. *Sepals* of two sizes, the three outer considerably longer than the two inner. *Petals* when mature at least three times as long as

the sepals. *Stamens* of three sizes, the smallest row of 5 has filaments about 4 times as long as the anthers, those of the largest row are more than twice as long while the filaments of the middle row are intermediate in height. *Ovary* consists of a glabrous basal portion and a sericeous upper portion considered by Brandis to be a stylopodium. Style is not quite as long as the hairy portion. *Ripe fruit* is usually, although not invariably, markedly beaked.

Collections examined—

PENANG: Curtis 201, 437 and four unnumbered specimens. S'pore 3301, 3341, 3463, 3691, 4330, 4569, 4578, 4902 and 9139; C. F. 11654, 11659, 11660 and 27776.

PERAK: C. F. 25430, 25523, 25569, 25750 and 25818.

DINDINGS: C. F. 27760.

PAHANG: C. F. 20353, 20447 and 23388.

BORNEO: Becc. 3092 (Type of *S. ovata,* Dyer); Haviland 2042.

This tree is typically a high hill form. Because of its habitat it is not well-known to Malays who, when they come across it, usually call it *meranti sarang punai* because of its resemblance to the common *meranti sarang punai* of the plains (*S. parvifolia*).

Shorea palembanica, Miq., Fl. Ind. Bat. Suppl. (1860) 487: *Shorea aptera,* Burck, Ann. Jard. Buit. vi (1887) 210, pl. 22: *Shorea brachyptera,* Heim, Bull. Soc. Linn. Paris, ii (1891) 957: *Pachychlamys Beccarianus,* Dyer, MSS. in herb. Kew: *Shorea lepidota,* Foxworthy, Mal. For. Rec. 10 (1932) 166; not of Blume, Mus. Bot. ii (1852) 32.—**Plate XLI.**

This species was first described as *S. palembanica* by Miquel from a sterile collection made by Teysmann in Palembang. In 1887 Burck examined Bornean collections in flower and fruit describing and figuring them as *S. aptera,* and four years later Heim re-described the tree as *S. brachyptera* from Beccari's collections from Sarawak.

I have not seen the specimens upon which Burck founded his *S. aptera,* but I have seen other collections verified by him, which, together with his published figure, leave no doubt as to his conception of the species. It is somewhat misleading however, that the leafy twig of his figure is from a sapling or, at any rate, is hardly characteristic of the mature form.

Foxworthy's *S. lepidota* is undoubtedly identical with the above. Presumably he has followed Van Slooten (ex

Heyne, Nutt. Plant. Ned. Ind. 2nd. edit. (1927) 1121) in reducing *S. aptera*, Burck to *S. lepidota* (Korth.) Bl. There has been great confusion of these species which I have endeavoured to straighten out in my notes under *S. lepidota*.

Under *Shorea Thiseltoni* (Syn. *S. singkawang* (Miq.) Burck) King has cited No. 8162 which clearly ought to be referred to *S. palembanica*, Miq.

Foxworthy, under *S. lepidota* gives an adequate description of this species but the following remarks are appropriate—The tertiary nerves of the leaf are parallel. The flowers are not reddish but yellow and are borne on a pedicel only 1 mm. long. The stamens are of three sets; the large inner row of five has filaments broadly dilated in the lower half, suddenly narrowing to the filamentous upper half; the two other rows are subequal, one row of five being borne on the backs of the inner large stamens with which the third five alternate; the filaments of these smaller stamens have a very short filamentous portion. The ovary is usually distinctly 5-ridged. All the immature fruits examined have three wings exceeding the nutlet by 1–2 cm. and two much shorter wings. The only perfectly mature specimens I have seen have had the wings broken. The nutlet is apiculate and velvety.

Collections examined—

PERAK:	King 8162 and C.F. 5696.
TRENGGANU:	C.F. 26800 and 26939.
PAHANG:	C.F. 2736 and 2741.
JOHORE:	S'pore 21184; C.F. 5905.
SUMATRA:	Herb. Utrecht 35907 (= Herb. Bog. 3681) Teysmann (Type of *S. palembanica*, Miq.); Herb. Bog. 3P/876, Irwaan.
JAVA:	Herb. Bog. 227 and sine no. "teste Burck"; Herb. Bog. sub VIII. D. 56[a] cult. in Hort. Bog.
BORNEO:	Herb. Bog. sine no., Teysmann "det. Burck," 2077 (bb. 1087) Labohm and sine no. Kuching, Hewitt; Beccari 2681, 3075 and 3507 (Types of *S. brachyptera*, Heim. [= *P. Beccarianus*, Dyer MSS.]); C.F. 390, Sarawak.

This tree is not well-known to Malayan Forest Officers. It is invariably found along stream banks and is rarely well shaped. It has been collected in Perak and Johore under the name of *sengkawang*, in Trengganu as *tengkawang ayer*, and in Pahang as *merpak*.

Shorea gibbosa, Brandis, Journ. Linn. Soc. xxxi (1895) 99: Ridley, Journ. Str. Br. R. As. Soc. 54 (1909) 23 and Flora. Mal. Penin. 1 (1922) 229; Foxworthy, Mal. For. Rec. 10 (1932) 208: *Hopea grisea,* Brandis, l.c. 63.—**Plate XLII.**

The descriptions of *S. gibbosa* and *H. grisea* were published contemporaneously by Brandis in 1895. Both were described from flowering collections, the former from Singapore by Ridley and the latter from Borneo by Beccari. It is difficult to understand how Brandis failed to identify the type collection of *S. gibbosa* with those of *H. grisea* as they are strikingly alike although the flowers of the latter are in the stage of young bud only whereas those of the former are almost fully developed. In examining the flowers of *H. grisea,* Brandis evidently noticed no gibbosities on the inner row of stamens. I have examined numerous flowers of *S. gibbosa* in various stages and find that the gibbosities are not evident in young buds.

Ridley amplified Brandis' original description in the works cited above and Foxworthy has reproduced Ridley's description. This description is adequate but Ridley has, I think, misinterpreted Brandis' statement with regard to the number of stamens. Brandis says "The filaments of the 5 inner stamens gibbous on the outside. Below this protuberance are inserted the 5 episepalous stamens of the outer circle." He does not state that the stamens are 10 only as Ridley and Foxworthy have inferred, and, as he has placed the species in the Section *Pinanga* presumably he recognised it to have 15 stamens. This actually is the case, the inner gibbous stamen being supported on the outside by two slightly smaller ones with overlapping filament bases. The gibbosity is not a solid structure but is in the nature of a hollow protuberance. There is also some discrepancy over the colour of the flowers. These I have never seen in fresh condition. Ridley originally stated that they were "pink" but later in his flora, pronounced them to be "creamy white."

Collections examined—

SINGAPORE:	Ridley 6079 (Type of *S. gibbosa,* Brandis) S'pore 3407 and 5963.
BORNEO:	Beccari 2232 and 2267 (Types of *H. grisea,* Brandis).

With this reduction we now have to record from Borneo this apparently rare species hitherto known only from a single tree which stood near the Botanic Gardens, Singapore.

Shorea eximia (Miq.) Scheff., Nat. Tijdschr. Ned. Ind. xxxi (1870) 349; Burck, Ann. Jard. Bot. Buitenzorg 6 (1887) 218; King, Journ. Asiat. Soc. Beng. lxii, 2

(1893) 121: *Vatica ? eximia,* Miq., Fl. Ind. Bat. Suppl. (1860) 486: *Vatica ? sub-lacunosa,* Miq. l.c.: *Shorea sub-lacunosa,* Scheff. l.c. 350: *Dilleniaceum ? nervosa,* Wall. Cat. 6635: *Shorea sericea,* Dyer, Hook. f. Fl. Brit. Ind. I (1872) 306; King, l.c. 111; Brandis, Journ. Linn. Soc. xxxi (1895) 101; Foxworthy, Mal. For. Rec. 10 (1932) 230: *Shorea rigida,* Brandis, Hook. Ic. Pl. (1895) t. 2402 and Journ. Linn. Soc. xxxi (1895) 102. **—Plate XLIII.**

This species was first described in 1860 by Miquel under two different names *Vatica ? eximia* and *Vatica ? sub-lacunosa.* His types were sterile collections from Sumatra and Bangka respectively. In 1870 Scheffer transferred these both to *Shorea* and in 1887 Burck united them.

A flowering collection (Maingay 202, Malacca) was first described by Dyer in 1872 as *Shorea sericea.* In 1895 Brandis referred a Bornean collection of Beccari, No. 2603, to *S. sericea* and redescribed the species as *Shorea rigida* from a Singapore collection of Ridley, No. 6393. These last two species have recently been united by Foxworthy.

Brandis, (l.c. 98) has united *S. eximia,* Scheff. with *S. furfuracea,* Miq. (l.c. 488) and has been followed by Ridley in Fl. Mal. Penin. I (1922) 232 and Merrill in Enum. Phil. Fl. Pl. III (1923) 96. I cannot agree to this union. The type of *S. furfuracea,* Miq. is an unsatisfactory sterile collection of immature leaves but is clearly different from *S. eximia,* Scheff. as has been pointed out by Van Slooten (ex Merr. Univ. Calif. Publ. Bot. 15 (1929) 204).

King did not unite *S. sericea* with *S. eximia* but in amplifying Dyer's description of the former, he evidently noted the resemblance between the species because he states—"This resembles *S. lacunosa,* Scheff., but differs in not having persistent stipules." (Presumably he has written "*S. lacunosa*" in mistake for "*S. sub-lacunosa.*").

The reduction of *S. sericea,* Dyer to *S. eximia,* Scheff. has already been indicated by Heyne (Nutt. Plant. Ned. Ind. 2nd edit. (1927) 1116) although in the 1917 edition of his work, p. 298, he gave *S. eximia,* Scheff. as a synonym of *S. furfuracea,* Miq. following Brandis.

The most complete description of this species is given by Foxworthy under *S. sericea* and Brandis' figure of *S. rigida* is very helpful. My experience in the examination of a number of flowers suggests the following alterations to Foxworthy's description—*Petals* elliptic oblong, retuse at apex, in mature flowers three times as long as sepals, glabrous within and along a narrow strip along one side without. *Stamens* from 55 to 67 (in flowers examined) on long filiform filaments, the longest almost as long as

the petals. Rudimentary appendage usually present although difficult to find. *Ovary* glabrous on lower portion but continued into an elongated conic sericeous stylopodium. Stigma broad and distinctly 3-partite.

Collections examined—

PENANG:	Curtis 431; S'pore 3471 & 3760; C. F. 2564 & 28019.
PERAK:	King 10998.
SELANGOR:	C. F. 733, 2445, 7052, 7909, 9623, 9642, 11200, 13925, 15289, 21373, 23853, 23867, 24005, 24014, 24708 & 26384.
NEGRI SEMBILAN:	C. F. 639, 646, 662, 665, 1930, 1931 & 23757.
MALACCA:	Maingay 202 (Type of *S. sericea*, Dyer).
TRENGGANU:	C. F. 26697, 26722, 26930, 26934 & 26938.
PAHANG:	C. F. 1022, 1794, 4068, 4529, 5456, 5475, 5732, 10859, 15015, 26511, 27954 & 28321.
SINGAPORE:	Wall. Cat. 6635 & Ridley 6393 (Type of *S. rigida*, Brandis).
SUMATRA:	"Pelembang, prope Muara-doea" Teysmann. (Type of *V. eximia*, Miq.).
BANGKA:	"Prope Plangas" Teysmann (Type of *V. sublacunosa*, Miq.).

The reduction made above recognises *Shorea eximia* as the correct botanical name for our common *meranti kepong*, the more commonly applied names of *S. sericea* and *S. rigida* lapsing into synonymy. There are many instances of species being described from immature sterile specimens and at another time from mature fertile collections under a different name. It is often not until more material representative of various stages of development is available that the names can be united. Just as a seedling form of *meranti tembaga* was described as *Shorea meranti* and later was united with *Shorea leprosula* which represented the mature form, so *S. eximia*, the immature form of *meranti kepong* is here united with *S. sericea* which represents the mature form. The older name which is retained, happens in this instance to have been applied to the immature form, whereas in the former instance it was applied to the mature form.

Shorea Maxwelliana, King, Journ. Asiat. Soc. Beng. lxii, ii 1893) 114; Ridley. Fl. Mal. Penin. I (1922) 227; Foxworthy, Mal. For. Rec. 10 (1932) 194: *Shorea utilis,* King, l.c. 119; Foxworthy, l.c. 177: *Shorea barbata,* Brandis, Journ. Linn. Soc. xxxi (1895) 81; Foxworthy, Mal. For. Rec. 3 (1927) 68 with plate and Mal. For. Rec. 10 (1932) 178: *? Shorea falcifera,* Dyer MSS. ex Brandis, l.c. 86: *Shorea ciliata,* Ridl., Agri. Bull. S.S. and F.M.S. 4 (1905) 63, not of King: *Shorea alba,* Ridl. Journ. Roy. As. Soc. S. Br. 82 (1920) 171.— **Plate XLIV.**

This species was first described by King in 1893 under two different names. The first was *S. Maxwelliana* which was based on two collections of fragmentary flowers and immature fruit made in Perak. The second was *S. utilis* described from a collection made in Penang. From his description it appears that he examined fairly good flowering material but now only fragmentary flowers remain on the sheet. There is no good reason why this should not have been identified with the material described as *S. Maxwelliana* but the latter have rather larger leaves and longer wings on the fruit.

The flowers of this species were first adequately described by Brandis in 1895 when he founded his *S. barbata* on a collection of Goodenough from Batang Malaka.

In examining the type material of *S. falcifera,* Dyer from Borneo I was struck by certain resemblances which it bears to *S. Maxwelliana.* When flowers of this Bornean form are available a more definite statement of the relationship of these species will be possible.

I have examined the collection of Moorhouse referred to by Ridley in op. cit. 1905, as *S. ciliata.* This undoubtedly is the species under discussion and not *S. laevis,* Ridl. to which Foxworthy refers it.

Ridley's *S. alba,* described in 1920, from a collection made in Penang is identical with *S. Maxwelliana.* The reduction of *S. alba,* Ridl. to *S. utilis,* King has already been made by Foxworthy in M.F.R. 10, 177. In the same year Ridley cited a sterile collection of *S. Maxwelliana* (Curtis 426) in describing his *Balanocarpus ovalifolius.* This same collection was wrongly identified by Brandis as *Balanocarpus latifolius* in l.c. 112 and also by Foxworthy in l.c. 143.

That Ridley had no clear conception of *S. Maxwelliana* is evident from the fact that in his flora he cites a specimen of Haniff from Penang (No. 3729) which is actually a Hopea.

With the aid of numerous sheets of this species in our collections it seems desirable to amplify the rather unsatisfactory descriptions hitherto given.

Leaves coriaceous, sometimes slightly inequilateral or subfalcate, usually lanceolate or ovate-lanceolate but may be oblong lanceolate, acuminate or caudate-acuminate, the base cuneate or occasionally rounded; the upper surface glabrous shining, chocolate or yellowish brown when dry; the lower similar or distinctly lighter or covered by a minute close peltate fugaceous tomentum; main nerves 7–11 pairs, curved, spreading, depressed and inconspicuous above, slightly raised and more conspicuous beneath; tertiary nerves finely curved and inconspicuous; length usually about 7.5 cm. x 3 cm., but may be from 5–11 cm. long and 2–5.5 cm. broad. Petiole 1–1.5 cm. *Panicles* axillary and terminal, up to 10 cm. long, stellate puberulous or covered with a white mealy tomentum; lateral branches distant, less than 1 cm. long, minutely tomentose, 3–6 flowered. *Flowers* distichous, very shortly pedicelled, more or less globular in bud, 2 mm. long, when expanded 5 mm. across. *Sepals* ovate-orbicular, blunt, densely tomentose outside, glabrous inside. *Petals* white, broadly oblong, blunt, slightly contort, sericeous outside, sparsely so inside. *Stamens* (in flowers examined) 24–41; filaments slightly dilated at base up to twice as long as the oblong bi-fid anthers; anther cells densely bearded above, minutely bearded below; appendage to connective slightly dilated, densely ciliate, slightly longer than the anther. (In immature flowers the connective and appendage are relatively shorter and the hairs at the foot of the anther cells are sometimes inconspicuous). *Ovary* conical, sericeous tomentose; style glabrous, usually short; stigma minute. *Ripe fruit* globose or ovoid, beaked, pale adpressed-sericeous, 1 cm. long; beak .5 cm. long, accrescent sepal wings closely adpressed to but free from the fruit, membranous, reticulate, deciduously puberulous, variable in size; the three outer similar, 7-nerved, broadly spathulate, slightly constricted at base from 3 x 1 cm. to 6.5 x 1.5 cm.; the two inner, 3–4 nerved, less than half as long, more or less linear.

Collections examined—

PENANG: Curtis 423 (Type of *S. utilis*, King) and 3651 (Type of *S. alba*, Ridl.); S'pore 3332, 3454, 3468, 3477, 3495, 3724 & 3733; C. F. 2568, 11671, 11677, 11680, 16637, 27774, 28030 & 28045.

PERAK:	King 3601 & 3744 (Types of *S. Maxwelliana,* King); C. F. 11736, 11966, 16054, 24480, 24503, 24640, 24645, 25413, 25423, 25429, 25487, 25821 & 25862.
DINDINGS:	C. F. 16560, 16577, 16597, 16651, 27764 & 27847.
SELANGOR:	C. F. 732, 24046, 24056 & 28053.
NEGRI SEMBILAN:	C. F. 5/1912, 401, 630, 653, 664, 721, 1901, 1934, 1982, 2145, 4314, 12821, 12822 & 23698.
MALACCA:	Ridley 1784 & 1789 (Types of *S. barbata,* Brandis); C. F. 2004, 4366 & 18272.
TRENGGANU:	C. F. 26903 & 26923.
PAHANG:	C. F. 4613, 4620, 4772, 4779, 5428, 5429, 5483, 5500, 5743, 6608, 6633, 10551, 10560, 10562, 10563, 15713, 15759, 15767, 26020 & 26036.
BORNEO:	? Beccari 2992 & 3046 (Types of *S. falcifera,* Dyer); ? Motley 37.

The failure to identify *S. Maxwelliana,* King with its synonyms given above has led to a regrettable vagueness in our conception of the botanical status of one of our most important hardwood trees. This tree is known usually as *damar laut daun kechil* in Penang, *damar laut kuning* in Kinta, *chengal batu* in the Dindings, *resak* in Selangor and Pahang, *kumus hitam* in Negri Sembilan and *tengkawang* in Trengganu but other names have also been applied (vide Foxworthy, Mal. For. Rec. 10 p. 177 and 179).

Shorea Faguetiana, Heim, Bull. Soc. Linn. Paris, ii (1891) 975; Brandis, Journ. Linn. Soc. xxxi (1895) 95: *Shorea dryobalanoides,* Dyer, MSS. in Herb. Kew: *Shorea Ridleyana,* King, Journ. Asiat. Soc. Beng. lxii, 2 (1893) 115 and Ann. Bot. Gard. Calc. V ii (1896) pl. 185B, in part; Brandis, l.c. 99; Foxworthy, Mal. For. Rec. 10 (1932) 209 in part.—**Plate XLV.**

This species was first described from Bornean collections of Beccari in 1891. In 1893 King described his *S. Ridleyana* citing two collections from Perak belonging to different species. No. 3617 upon which his description appears mainly to be based is *S. Faguetiana,* while 3571 is *Shorea hopeifolia* (Heim) Symington. King's figure in

Ann. Bot. Gard. Calc. represents for the most part the former species but the detail of leaf venation is typical of the latter.

Brandis in l.c. says of the flowers of *S. Ridleyana*— " Appendage to connective denticulate towards the apex." I have failed to see any sign of denticulation in any of the flowers examined. Foxworthy has reproduced the descriptions of King and Brandis without amplification and has considered together our collections of this species and of *S. hopeifolia* under the name of *S. Ridleyana.*

King and Ridley have suggested a close relationship between *S. Ridleyana* and *S. Maxwelliana* but it appears to me that the relationship is very remote. The species most closely allied to *S. Faguetiana* are, in my opinion, *S. hopeifolia* (Heim) Symington and *Balanocarpus multiflorus* (Burck) Symington notwithstanding the fact that the last must be kept apart under the present generic conception.

I am uniting *S. Faguetiana* and *S. Ridleyana* only after careful examination of collections both from Borneo and the Peninsula. Most of the Bornean collections have rather larger leaves than our collections but there is overlapping in this respect. The only fruits I have seen from Borneo are on Beccari 2954 and 2960. In form and texture these are identical with the fruit of our tree but the calyx wings are slightly longer.

The description by King of *S. Ridleyana* together with the drawing accompanying these notes should be adequate definition of this species.

Collections examined—

SIAM:	S'pore 24219, 24222, 24224 and 24339.
KEDAH:	C.F. 8907, 12225, 21924 and 27402.
PERAK:	King 3617 (Type of *S. Ridleyana*, King); C.F. 11591, 12067, 24512, 25439 and 25711.
SELANGOR:	C.F. 18226, 18247, 23094, 23211, 24386, 24394, 24397, 24398, 24450 and 24706.
NEGRI SEMBILAN:	C.F. 23348 and 23681.
PAHANG:	C.F. 1275, 3945, 3949, 5510, 6620, 6651, 8877, 9505, 10576, 10713, 10714, 10715, 10731, 12836, 15752, 23167, 23370 and 29305.

BORNEO: Becc. 2566, 2954, 2960 and 3039 (Types of *S. Faguetiana*, Heim). C.F. 12992, 28652, 28656, 28693 and 28705 (Brunei). ? Baram 241 and 307.

(*Note.*—It is possible that Baram 241 and 307 may belong to this species. The flowers are identical in every way with those of *S. Faguetiana* except for the petals which are much longer than any I have seen in our collections).

This is the tree which is usually called *damar siput*. Herbarium collections show considerable variation resulting in the tree having been described under two different names. These are here united and the older name of *S. Faguetiana* is retained.

Shorea hopeifolia (Heim) Symington, new comb.: *Cotylelobium ? hopeifolium*, Heim, Bull. Soc. Linn. Paris, i (1891) 971: *Shorea Ridleyana*, King, Journ. Asiat. Soc. Bengal, lxii, pt. 2 (1893) 115, in part; Foxworthy, Mal. For. Rec. 10 (1932) 209, in part: *Hopea Heimiana*, Brandis, Journ. Linn. Soc. xxxi (1894) 63: *Hopea albescens*, Ridley, Journ. Str. Br. R. As. Soc. 73 (1916) 142; not of Foxworthy, l.c. 122.—**Plate XLVI.**

Heim first described this species in 1891 from a fragmentary flowering collection of Beccari, No. 2491, referring it with hesitation to the genus *Cotylelobium* and giving it the inappropriate specific epithet "*hopeifolium*." Two years later Brandis examined the same collection and transferred the plant to *Hopea*, renaming it *Hopea Heimiana*. In his description Brandis complains of the fragmentary nature of his material and gives rather an unsatisfactory account of the flower structure. In examining the same collection I was fortunate in finding one almost perfect flower which has enabled me without doubt to establish the identity of the plant with Ridley's *Hopea albescens*. In 1893 King described his *Shorea Ridleyana* from two sheets, Nos. 3617 and 3571. The former, upon which his description appears mainly to be based, is *S. Faguetiana*, Heim. to which I have reduced King's species, but No. 3571 is identical with *S. hopeifolia* (Heim) Symington. These species are so very closely related that it is not surprising that confusion should have occurred.

Foxworthy has followed King in including our collections of this species together with those of *S. Faguetiana*

under *S. Ridleyana*. To *Hopea albescens*, Ridl. he has referred a number of our collections which will probably turn out to be *Hopea fagifolia*, Miq.

Fruiting collections of this species have enabled me definitely to refer the plant to the genus *Shorea*. Unfortunately I must resurrect the specific epithet of Heim which is inappropriate and misleading.

Previous descriptions of this tree being hardly adequate I have prepared the following—

A medium to large tree; young branchlets slender, dark, lenticellate, minutely ridged and glabrous. *Leaves* thinly coriaceous glabrous, broadly ovate or oblong-lanceolate, bluntly acuminate at the apex, base rounded or cuneate sometimes with two glands at the insertion of the petiole; margin slightly inrolled; when dry usually purplish brown above, lighter beneath with purple veins; 4.5–9 cm. long, 2–5 cm. broad; petiole a little over 1 cm., rugose; secondary nerves 8–12 prs. spreading, inarching towards the margin, conspicuous beneath; between the secondary nerves 2 or 3 tertiary nerves leave the midrib parallel to the secondaries; tertiary reticulations usually distinct beneath. *Panicles* axillary and terminal, up to 7 cm. long, densely sericeous or fulvous pubescent, lax, branches each with 4–6 flowers, distichous and regularly alternating; flower bracts fugaceous, oblong, obtuse cymbiform, sericeous pubescent without. *Flowers* secund, 6 mm. long including the pedicel; pedicel 2 mm. *Sepals* sub-equal, rotundate, retuse (sometimes mucronate) at the apex, tomentose outside, glabrous within. *Petals* oblong, fimbriate obtuse at apex, 3 mm. long, pale yellow, sparsely puberulous outside. *Stamens* 15, sub-equal; filaments dilated in the lower half, arranged in 3's (2 long and 1 short) opposite each petal; anthers shorter than the filaments; awn filiform about the same length as the anther. *Ovary* conical, tomentose; stylopodium present but not obvious; style short, cylindric, glabrous; stigma minute. Fruit (immature) ovoid, pale tomentose, 5 mm. long, enclosed by but free from the accrescent calyx cup which is distinctly 5-angled, flattened at the base and sparsely stellate puberulous; wings papyraceous, puberulous with 7 longitudinal veins; 3 large wings sub-equal 5 cm. long, 1 cm. broad; 2 small wings 3 cm. long and 6 mm. broad.

To avoid further confusion of these very closely allied species, the main diagnostic characters of *S. hopeifolia* and *S. Faguetiana* are here enumerated. Along with these the characters of *Balanocarpus multiflorus* (Burck) Symington (= *B. penangianus*, King) are also considered, because although this species is quite distinct when in fruit, in

flower, vegetative characters and in the field it comes very close indeed. So remarkably similar are these three species that one cannot but doubt the sagacity of considering the nature of the fruiting calyx as a reliable index to the natural group to which they belong.

	Shorea hopeifolia	Shorea Faguetiana	Balanocarpus multiflorus
Leaves	Usually oblong-lanceolate or broadly ovate, purplish-brown above, greenish-brown or purple beneath with conspicuous purple veins. Secondary nerves 8-12 prs.; two or three tertiary nerves leave the midrib between each of the secondary nerves and parallel to them.	Ovate-lanceolate, usually larger than those of the other two species, when dry usually pale green or yellow above and lighter beneath Secondary nerves 8-12 prs.; tertiary nerves not as in *S. hopeifolia*	Usually oblong lanceolate, pale viridian above and golden yellow beneath. Secondary nerves 7-10 prs.; tertiary nerves not as in *S. hopeifolia*
Flower pedicel	2 mm. long	1 mm. long	Less than 1 mm. long
Sepals	Rotundate, retuse, sometimes mucronate	Obovate, acute	Triangular, obtuse & sometimes mucronate
Petals	A little more than twice as long as sepals	As in *S. hopeifolia*	About six times as long as sepals
Appendage to connective	As long as anther	Between 1 & 2 times as long as anther	As long as anther
Ovary	Densely tomentose	Minutely puberulous	Minutely puberulous
Fruit	Segments of fruiting calyx all enlarged into wings	As in *S. hopeifolia*	Segments of fruiting calyx forming a toothed cup shorter than the fruit.

Collections examined—

PERAK: King 3571 (cited as *S. Ridleyana* by King).

NEGRI SEMBILAN: C.F. 648.

PAHANG: " D^2 and D^3 ", De Sylva (Types of *H. albescens*, Ridl.); C.F. 0704, 5158, 5444, 6618, 7931, 8112, 8353, 13784, 15702, 23251 and 26037.

JOHORE: C.F. 5851.

BORNEO: Beccari 2491 (Type of *C. hopeifolium*, Heim and *H. Heimiana*, Brandis).

As yet we know but little of this tree in the jungle. Most of our collections are from the east of the Main Range in Pahang but it has also been collected in Tebong Reserve in Negri Sembilan and near Kluang in Johore. It has been collected under the names of *seraya, seraya batu, seraya labu, damar hitam* and *damar siput jantan.* The indications are that it closely resembles *Shorea Faguetiana* (damar siput) and *Balanocarpus multiflorus* (damar hitam) in the field as well as in the herbarium.

Balanocarpus multiflorus (Burck) Symington, new comb.: *Doona multiflora,* Burck, Ann. Jard. Bot. Bog. VI (1887) 234: *Richetia latifolia,* Heim, Bull. Soc. Linn. Paris, ii (1891) 976: *Richetia oblongifolia,* Heim l.c., 979: *Richetia acuminata,* Heim, l.c. 979: *Richetia penangiana,* Heim, l.c. 980: *Balanocarpus penangianus,* King, Journ. Asiat. Soc. Bengal, lxii, pt. 2 (1893) 131 and Ann. Bot. Gard. Calcutta, V. 2 (1896) 158, Pl. 191B.; Foxworthy, Mal. For. Rec. 3 (1927) 58, with 2 plates, and Mal. For. Rec. 10 (1932) 143: *Hopea multiflora,* Brandis, Journ. Linn. Soc. xxxi (1895) 60; not of Foxworthy, Mal. For. Rec. 10 (1932) 119: *Balanocarpus latifolius,* Brandis, l.c. 112; Foxworthy l.c. 145: *Balanocarpus acuminatus,* Brandis, l.c. 113.— **Plate XLVII.**

This species was first described as *Doona multiflora* by Burck in 1887 from a flowering collection made in Sumatra. In 1895 Brandis identified with this a collection bearing flowers made by Curtis in Penang and transferred the species to *Hopea.* Meanwhile Heim had described *Richetia latifolia, R. oblongifolia* and *R. acuminata* from fruiting collections made by Beccari in Borneo and *R. penangiana* from a collection of Curtis from Penang. These four collections are undoubtedly all of the same species but are representative of the variation found in leaf size and shape. Heim's species did not long remain in the genus to which he referred them. In 1893 King referred *Richetia penangiana* (Heim's type of the genus) to the older genus *Balanocarpus,* and in 1895 Brandis transferred *R. latifolia* and *R. acuminata* to the same genus and reduced *R. oblongifolia* to synonymy with *Balanocarpus latifolius.*

In 1899 Boerlage, in Cat. Hort. Bog. p. 102, drew attention to the similarity between *H. multiflora,* Brandis and *B. penangianus,* King but the reduction was never made.

Foxworthy's conception of *Balanocarpus penangianus* is quite clear and the collections C.F. 8135 and 15756 have quite reasonably been referred by him to *B. latifolius,* but

they differ from the collections under *B. penangianus* only in inessential characters which do not constitute specific distinction. He is mistaken, however, in referring the collections cited under *Hopea multiflora* (Burck) Brandis to that species. These collections belong to two distinct species one of which is probably *Hopea fagifolia*, Miq. and the other appears to be most closely related to *Hopea plagata*, Vidal.

This species has been adequately botanically described and figured by King under *Balanocarpus penangianus* but with the supply of material now available it is possible to make the following amplification—

The leaves may have as many as 10 pairs of nerves which are raised and often very conspicuous on the lower surface. The fine reticulations of the leaf may be inconspicuous or clearly defined and of a pellucid nature. It is very characteristic of the species that the leaves usually dry to a pale viridian colour above and a light golden-brown beneath. Some leaves may be over 5 cm. broad. Although 15 is the usual number of stamens, occasionally only 10 are present. Occasionally there are distinct indications of a stylopodium. The fruit may be considerably more swollen in the upper portion than King has figured it and may be as much as 2 cm. long and 1.2 cm. broad.

Collections examined—

PENANG:	Curtis 429 (type of *R. penangiana*, Heim) and 3605; S'pore 3145, 3264, 3293, 3403, 3469, 3492, 3714, 3748 and 4650; C.F. 1844, 2470, 2562, 10846 and 11656.
KEDAH:	C.F. 8905 and 27470.
PERAK:	King 3333; C.F. 0114, 4571, 8843, 25428, 25449, 25508, 28982 and 28983.
DINDINGS:	C.F. 16584 and 27850.
SELANGOR:	C.F. 5204, 9971, 10819, 12954, 14830, 14831, 22057, 22073 and 22832.
NEGRI SEMBILAN:	C.F. 1790, 2006, 2125, 6552 and 12823.
MALACCA:	C.F. 2064.
TRENGGANU:	C.F. 26707 and 26744.
PAHANG:	C.F. 8135, 15756, 15770 and 26175.

SUMATRA: "Ex. Herb. Bog. Recd. Kew 3/1888" (? type of *D. multiflora*, Burck).

BORNEO: Beccari 2511 (type of *R. oblongifolia*, Heim), 2892 (type of *R. latifolia*, Heim) and 2942 (type of *R. acuminata*, Heim); C.F. 28703 (Brunei).

This is the tree commonly known to Malayan Forest Officers as *damar hitam* under the specific name of *Balanocarpus penangianus*, King. With the reduction of King's species to synonymy with the species originally described by Burck as *Doona multiflora* the specific epithet of the former gives way to the older epithet and the new combination becomes *Balanocarpus multiflorus* (Burck) Symington.

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Names of species especially dealt with in this paper are shown in heavy type and synonyms are printed in italics.

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PLATE XLIV. **Shorea Maxwelliana**, King. 1, flowering twig. 2, 3, mature fruit. 4, expanded flower. 5, corolla from mature flower. 6, flower bud. 7, 8, sepals. 9, 10, ovary. 11, stamen from mature flower. 12, stamen from bud. 13, bundle of immature stamens. (*Scale applies to Nos. 1 to 3 only*).

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Plate 33.

Gard. Bull. S.S. Vol. VII.

Plate 34.

Gard. Bull. S.S. Vol. VII.

Plate 35.

Gard. Bull. S.S. Vol. VII.

Plate 36.

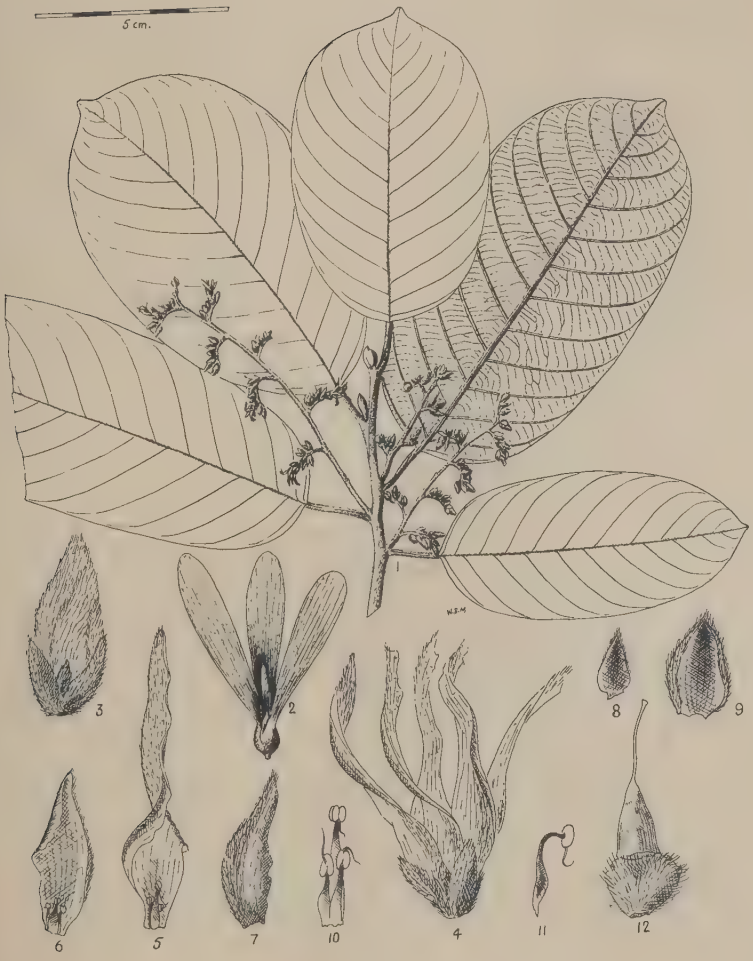

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Plate 37.

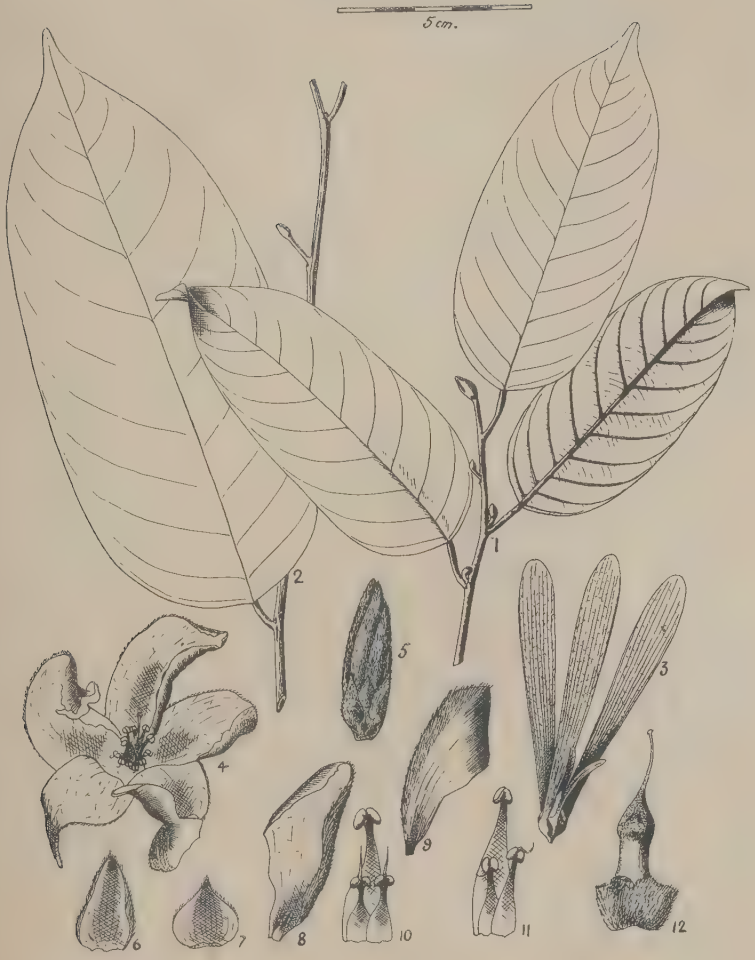

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Plate 38.

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Plate 39.

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Plate 40.

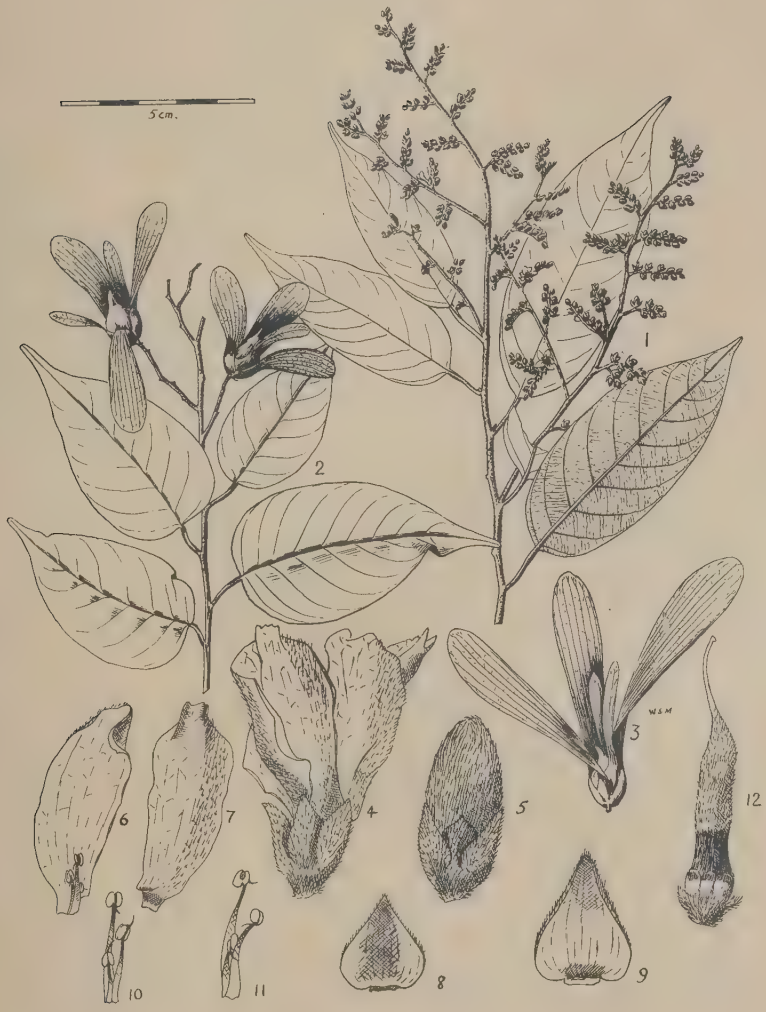

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Plate 41.

Gard. Bull. S.S. Vol. VII.

Plate 42.

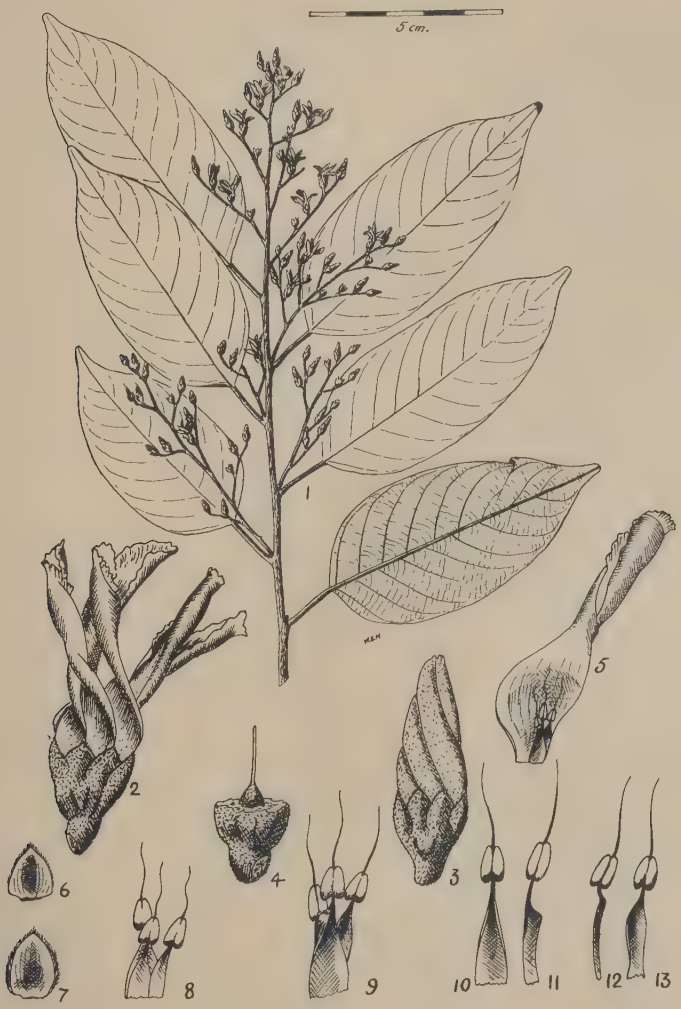

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Plate 43.

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Plate 44.

Plate 45.

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Plate 46.

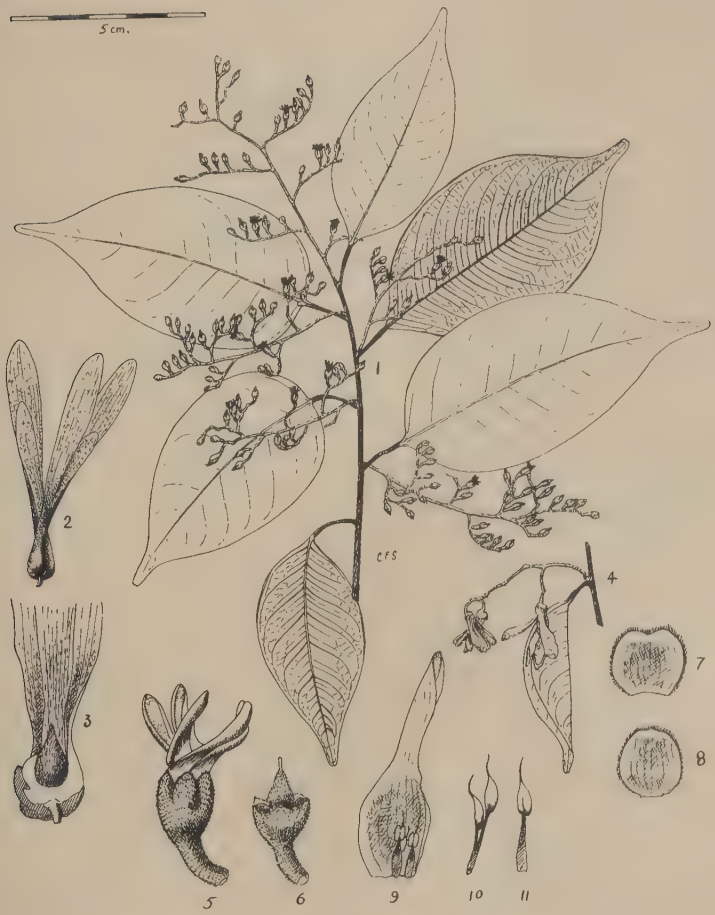

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Plate 47.

Gard. Bull. S.S. Vol. VII.

ENUMERATION OF MALAYAN EBENACEAE.

(With brief descriptions of new and noteworthy species).

By R. C. Bakhuizen van den Brink.

On account of economic circumstances it will take a considerable time before my studies on the Malayan Ebenaceae can be printed in full. It is evident that the elaboration of such a complicated family as the Ebenaceae necessitated the removal of a large number of old specific names and a considerable addition of new ones. Therefore, to avoid further confusion in the nomenclature of the family, it is necessary to give at least a superficial survey, as soon as possible, of the results obtained. The following contribution serves to enumerate the number of species which, in my opinion, occur within both the Malay Archipelago and Peninsula.

While studying the Ebenaceae of the Malay region I became fully convinced that no valid grounds can be found for keeping the genus *Maba* separate from *Diospyros*. Hiern in his excellent monograph did not succeed in laying down hard and fast boundaries between the two genera on natural principles. But, when that work was published in 1873, much less material of intermediate and transition forms was known than at the present time. Therefore I decided to unite the genera *Diospyros* (sensu stricto) and *Maba* into one: *Diospyros* sensu latiore, the more so as it is impossible to indicate any practical advantage in the separation. In order not to lose sight of the old genus *Maba*, I thought it advisable to give it the rank of a subdivision together with three other subgenera, into which I now divide the enlarged genus *Diospyros* L., as far as the Malayan regions are concerned.

Diospyros DALECH ex LINN. (sensu latiore).

(Conspectus subgenerum).

A. Ovarium 3-6-loculare; loculis 1-2-ovulatis; ovulis in toto 6. Flores 3-meri, raro 4-5-meri. Calix aestivatione valvatus vel subvalvatus, interdum accrescens. Semina albumine aequabile vel ruminato.—Utriusque orbis reg. calid. α subgen. **Maba** (J. R. et G. FORST.) BAKH.

B. Ovarium 2-3-loculare; loculis 2-ovulatis; ovulis in toto 4-6. Flores 4-5-meri. Calicis lobi suborbiculares vel reniformes, aestivatione contorte imbricati, non vel vix accrescentes. Semina albumine ruminato.—Asia reg. calid. β subgen. **Hierniodendron** BAKH.

C. Ovarium 4-loculare; loculis 2-ovulatis; ovulis in toto 8. Flores 4-meri. Calicis lobi triangulares, aestivatione valvati. Semina albumine aequabile.—Australia. γ subgen. **Cargillia** (R.BR.) BAKH.

D. Ovarium 4-5-, 8-10- vel 16-?20-loculare; loculis 1-ovulatis; ovulis in toto 4-5, 8-10 vel 16-?20. Flores 4-5-7-(?8-10)-meri. Calicis lobi valde variabiles vel rarius subnulli, aestivatione plerumque imbricati. Semina albumine aequabile vel ruminato.—Utriusque orbis reg. calid., Asia temp., America bor. δ subgen. **Eu-Diospyros** (L.) BAKH.

α Subgen. **Maba** (J. R. et G. FORST.) BAKH.

1. **Diospyros carpinifolia** (RIDL.) BAKH., comb. nov.—*Maba sumatrana* MIQ.; *Maba carpinifolia* RIDL.

2. **D. confertiflora** (HIERN) BAKH., comb. nov.—*Maba confertiflora* HIERN.

3. **D. ellipticifolia** (STOKES) BAKH., comb. nov.—*Maba elliptica* J. R. et G. FORST.; *Ferreola ellipticifolia* STOKES.

4. **D. fasciculosa** F. v. MUELL.—*Maba fasciculosa* F. v. MUELL.

5. **D. ferrea** (WILLD.) BAKH., comb. nov.—*Maba buxifolia* (ROTTB.) A. L. JUSS.; *Ehretia ferrea* WILLD.

6. **D. hermaphroditica** (ZOLL.) BAKH., comb. nov.—*Maba hermaphroditica* ZOLL.

7. **D. Holttumii** BAKH., spec. nov. **Plate XLVIII**—Frutex; ramulis glabris. Folia tenuiter coriacea, ovato-oblonga, basi obtuse cuneata, apice obtuse acuminata, utrinque glabra; nervis lateralibus utrinsecus 7-10, utrinque prominulis, venis utrinque inconspicuis; petiolo semitereti, glabro, 0.5—1 cm longo. Flores dioici;—feminei solitarii, subsessiles; calice profunde 3-4-lobato, intus glabro, lobis ovato-oblongis, acute acuminatis,

striatis. Fructus depresso-globosus, nitidus, glaber, 1—2 cm diam.; seminibus 6-8, albumine aequabile; calice lobis coriaceis, apice reflexis, 0.75—1 cm longis, 0.5—0.75 cm latis.—Kedah (HOLTTUM 15122).

8. **D. Janowskyi** BAKH., spec. nov.—*Maba Janowskyi* BAKH., msc.—Frutex. Folia lanceolata vel oblanceolata, dense verruculosa et pellucido-punctata, 7.5—17.5 cm longa, 2.5—5.5 cm lata, apice breviter subcaudato-obtuse acuminata; petiolo tereti, 0.15—0.3 cm longo. Cymae gracile pedunculatae, subpaniculatae, 3-5-florae. Flores masculi staminibus 9-12; feminei staminodiis 0; ovario pubescente, 6-loculare, loculis uniovulatis. Fructus oblongo-ellipsoideus vel subfusiformis, distincte verruculosus, pubescens vel maturitate glabrescens, 3—4.5 cm longus; seminibus albumine aequabile; calice 3-lobo, intus glabro, 0.35—0.5 cm diam.; lobis late ovatis obtusis.—Nova Guinea (JANOWSKY 109).

9. **D. malayana** BAKH., nom. nov.—*Maba punctata* (KORTH.) HIERN.

10. **D. rostrata** (MERR.) BAKH., comb. nov.—*Maba rostrata* MERR.

11. **D. tahanensis** BAKH., spec. nov.—*Maba tahanensis* BAKH., msc.—Arbor mediocris. Folia elliptico-oblonga vel lanceolata, basi obtusa vel rotundata, apice obtuse acuminata, verruculosa et dense pellucido-punctata, utrinque glaberrima, 10—22 cm longa, 2.5—6.5 cm lata; petiolo semitereti, 0.7—1 cm longo. Cymae subsessiles, multibracteatae. Fructus ovoideo-oblongus vel subellipsoideus, utrinque rotundatus, breviter apiculatus, verruculosus, primo tomentosus, maturitate glabrescens, 2—3 cm longus, 1.5—2 cm diam., 6-locularis, loculis monospermis; seminibus albumine aequabile; calice profunde 3-lobo, intus glabro, 0.5—1 cm diametro.—Pahang, Tahan River (RIDLEY—VIII. 1891).

β Subgen. **Hierniodendron** BAKH.

12. **D. evena** BAKH., spec. nov.—Arbor mediocris. Folia firmiter coriacea, elliptica vel oblanceolata, basi

angustata, obtusa, apice rotundata, emarginata, adulta utrinque glabra, 2—9 cm longa, 1—3 cm lata, venis inconspicuis; petiolo semitereti. Flores feminei solitarii, breviter pedunculati; pedunculo tomentoso, 0.15—0.2 cm longo; calice intus glabro. Fructus ellipsoideus, primo pubescens, denique glabratus, 2—3 cm longus.—Borneo (HAVILAND and HOSE 3348; Boschpr. bb. 7264, 7789, 12643).

13. **D. Maingayi** (HIERN) BAKH., comb. nov.—*Maba Maingayi* HIERN.

14. **D. puncticulosa** BAKH., nom. nov.—*Maba Beccari* HIERN.

γ Subgen. **Cargillia** (R.BR.) BAKH.

Only known from Australia.

δ Subgen. **Eu-Diospyros** (L.) BAKH.

15. **D. adenophora** BAKH., spec. nov.—Arbor parva; ramulis glabris. Folia coriacea, elliptico-oblonga, basi obtusa vel rotundata, apice breviter acute acuminata, utrinque levia, glaberrima, 15—25 cm longa, 5—7 cm lata, nervis venisque densis, utrinque inconspicuis, tenuiter prominulis; petiolo semitereti. Cymae femineae sessiles, 2-5-florae. Fructus mediocris, ovoideus, dense tuberculatus, primo tomentosus, denique glabratus, 8-10-locularis; seminibus albumine aequabile; calice profunde 4-5-lobato, utrinque velutino; lobis ovatis acutis, medio incrassatis, marginibus dilatatis, inter lobos saccatim confluentibus, 0.5—0.7 cm longis, 1 cm latis.—Peninsula malayana (RIDLEY 13051; HENDERSON 22468).

16. **D. amboinensis** BAKH., spec. nov.—Arbor. Folia coriacea, oblongo-obovata, 20—35 cm longa, 5—12.5 cm lata, basi rotundata vel subcordata, apice breviter acute acuminata, subtus sericea, denique glabrescentia; petiolo brevi, semitereti. Fructus magnus, depresso-globosus, maturitate glabratus; seminibus albumine aequabile; calice 5-fido, intus glabro.—Ambon (TEYSMANN HB. 1917).

17. **D. apiculata** HIERN.

18. **D. areolata** KING et GAMBLE.

19. **D. argentea** GRIFF.

20. **D. aurea** TEYSM. et BINNEND.

21. **D. Baloen-idjoek** BAKH., spec. nov.—Arbor mediocris. Folia elliptico-oblonga, 2—10 cm longa, 1—3.5 cm lata, basi obtusa vel rotundata, apice obtuse acuminata, subtus primo appresse pilosa, denique costa excepta glabra, penninervia, costa utrinque prominula, nervis utrinsecus 5-7, basalibus ceteris longioribus, venis utrinque inconspicuis; petiolo tereti, tomentoso, 0.3—1 cm longo. Flores dioici, 4-meri;—masculi breviter cymosi, terni; cymis bibracteatis; calice profunde partito, extus tomentoso, intus glabro; tubo subnullo; lobis imbricatis, suborbicularibus, ciliatis, 0.15—0.2 cm longis, 0.1—0.15 cm latis; corolla hypocrateriforme, extus sericea, intus glabra, 1—1.5 cm longa; staminibus 8-16, pubescentibus.—Sumatra (Boschpr. bb. 9147, nom. vulg.: Baloen idjoek, Mal.).

22. **D. bangkana** BAKH., spec. nov.—Frutex; ramulis virgatis, juniores rufo-hirtis. Folia ovato-oblonga vel oblanceolata, 2.5—12 cm longa, 1.5—5 cm lata, basi cuneata vel obtusa, apice abrupte breviter acuminata, costa excepta utrinque glabra; petiolo subtereti, rufo-hirto, 0.3—0.7 cm longo. Aff. *D. malaccensis* BAKH.—Ins. Bangka (TEYSMANN 3404 HB.).

23. **D. bantamensis** KDS. et VAL., msc.—Arbor mediocris. Folia firmiter coriacea, ovato-oblonga vel oblongo-elliptica, 4—12 cm longa, 1.5—4 cm lata, basi obtusa vel rotundata, apice acuminata, nervis utrinsecus 5—10, cum venis tenuibus utrinque prominulis; petiolo semitereti, 0.5—1 cm longo. Fructus solitarius, brevissime pedunculatus, depresso-globosus, maturitate glabrescens, 4—6 cm diam.; seminibus 4-8, albumine ruminato; calice 4-lobato, utrinque tomentoso; lobis late ovatis reflexis, 0.7—1 cm longis, 1—2 cm latis.—Java, Bantam (KOORDERS 1718β.).

24. **D. Beccarii** HIERN.

25. **D. bibracteata** BAKH., spec. nov.—Arbor mediocris; ramulis verruculoso-lenticellatis. Folia chartacea, ovato-oblonga vel obverse oblonga, 17.5—35 cm longa, 7—11 cm lata, basi obtuse cuneata, apice breviter obtuse acuminata, glabrescentia, nervis utrinsecus 10-12, venis laxis obscuris, utrinque prominulis; petiolo semitereti. Flores feminei

solitarii vel terni, pedunculati; pedunculo bibracteato; calice coriaceo, utrinque pubescente, medio 4-lobato; lobis late ovatis, obtusis vel rotundatis, marginibus reflexis; ovario globoso, sericeo, 8-loculare; loculis uniovulatis. Aff. *D. perfidae* BAKH.—Pahang (HENDERSON 24512).

26. **D. borneënsis** HIERN.

27. **D. brevicalyx** BOERL. et KDS. ex KDS., in KDS.—SCHUM., Syst. Verzeich., II, Sumatra (1911) 50.

28. **D. buxifolia** (BL.) HIERN.

29. **D. campanulata** BAKH., spec. nov.—Folia chartacea, oblongo-elliptica vel lanceolato-oblonga, 9—20 cm longa, 3.5—8 cm lata, basi obtusa, apice subcaudato-obtusiuscule acuminata, costa excepta utrinque glabra, nervis utrinsecus 10-15, venis laxis, utrinque prominulis; petiolo semitereti, 1—1.25 cm longo. Fructus solitarius, pedunculatus, globosus, nitidus, glaber; calice valde accrescente, quadrangulare campanulato, utrinque glaberrimo, 2—3 cm longo, 3.5—5 cm diam., tubo cruciato, crasso; lobis marginibus dilatatis, coriaceis, nervosis, confluentibus, inter lobos saccatis.—Borneo (TEYSMANN 7962 HB.).

30. **D. cauliflora** BL.

31. **D. celebica** BAKH., spec. nov.—Arbor mediocris; ramulis sericeis. Folia coriacea, lineari elliptica, 12—35 cm longa, 2.5—7 cm lata, basi angustata, apice acuminata, supra nitida, glabra, subtus glauca, sericea, nervis densis, venis tenuibus, utrinque prominulis; petiolo semitereti, sericeo, 0.3—1 cm longo. Flores 4-meri;—feminei solitarii;—masculi cymosi; calice utrinque sericeo vel intus glabrescente, lobis ovato-oblongis, basi unilateraliter cordatis, obtusis vel rotundatis, 0.5—0.7 cm longis, 0.3—0.5 cm latis; corolla hypocrateriforme; staminibus 16, sessilibus. Fructus subsessilibus, ovoideus, primo sericeus, denique glabratus; seminibus 4-8, albumine aequabile; calice intus glabrescente, 2 cm diametro.—Celebes (HEYNE 2564 et 2878).

32. **D. clavipes** BAKH., spec. nov.—Folia chartacea, oblongo-elliptica, 9—15 cm longa, 4—6 cm lata, basi cuneata, apice breviter acuminata, subtus glabrescentia, basi glandulis 2-4, nervis utrinsecus 6-10; petiolo semitereti, 0.5—1 cm longo. Fructus

pedunculatus, depresso-globosus, tomentosus, 3—3.5 cm diam.; seminibus albumine aequabile; calice campanulato, utrinque pubescente, leviter 4-lobato; lobis late ovatis, 0.5—0.7 cm longis, 1.5—2 cm latis.—Borneo (TEYSMANN 11397 HB.).

33. **D. Clementium** BAKH., spec. nov.—Frutex; ramulis virgatis, piloso-hispidis, glabrescentibus. Folia brevissime petiolata, membranacea, lineari-oblonga, 1.5—4 cm longa, 0.5—1 cm lata; basi rotundata vel leviter cordata, apice angustata, obtusa, margine ciliata, dense pellucido-punctata, subtus sparse pilosa, penninervia, nervis subdensis, subinconspicuis; petiolo tereti, rufo-hispido, 0.1 cm longo. Aff. *D. subrhomboideae* K. et G.—Borneo, Sarawak (J. et M.S. CLEMENS 20098).

34. **D. conformis** BAKH., spec. nov.—Arbor mediocris. Folia coriacea, elliptico-oblonga, basi late cuneata, apice subabrupte acuminata, utrinque rugosa, glabra, nervis cum venis utrinque prominulis; petiolo semi-tereti, glabro, 1—1.5 cm longo. Flores feminei solitarii, longiter pedunculati; calice campanulato, 4-5-lobato, intus pubescente. Fructus pedunculatus, submagnus, ovoideo-globosus, glaber, 8-locularis; loculis monospermis; seminibus albumine ruminato; calice applanato, subquadro, statu sicco sublignoso, intus tomentoso, 3—4 cm diam.—Perak (HAMID 10384).

35. **D. confusa** BAKH., spec. nov.—Folia chartacea, oblonga vel lanceolato-oblonga, 5.5—8.5 cm longa, 1.5—3 cm lata, basi obtuse cuneata, apice acuminata, subtus appresse pubescentia, pellucido-punctata, nervis venisque tenuibus, utrinque leviter prominulis; petiolo tereti, tomentoso, 0.2—0.5 cm longo. Flores dioici;—masculi subsessiles, cymosi; calice 4-fido, extus pubescente, intus glabro, lobis ovatis, obtusis vel rotundatis, 0.3—0.35 cm longis, 0.2—0.25 cm latis; corolla hypocrateriforme, extus sericea, intus glabra; staminibus—12, glabris.—Hort. Bot. Singapore (C. A. BAKER).

36. **D. cordata** (HIERN) BAKH., comb. nov.—*Maba cordata* HIERN.

37. **D. coriacea** HIERN.

38. **D. crassipes** BAKH., spec. nov.—Folia chartacea, lanceolato-oblonga, 7—15 cm longa, 2.5—6 cm

lata, basi cuneata, apice breviter subcaudato-acuminata, utrinque glabra, dense pellucido-punctata, basi glandulis 2-4, nervis utrinsecus 4-7; petiolo semitereti, glabro, 0.5—1 cm longo. Fructus breviter pedunculatus, rufo-hispidus, glabrescens; calice late campanulato, medio 4-lobato, intus pubescente, lobis deltoideis, erectis; pedunculo tumido. Aff. *D. clavipedis* BAKH.—Borneo, Sarawak (BECCARI 2041).

39. **D. cubica** BAKH., spec. nov.—Arbor; ramulis glabris. Folia coriacea, elliptico-oblonga, 15—20 cm longa, 7—9 cm lata, basi obtusa, apice breviter acuminata, utrinque glabra, nervis utrinsecus 10—15, supra cum venis inconspicuis, impressis; petiolo semitereti, glabro ± 1 cm longo. Fructus solitarius, subsessilis, statu sicco subcubicus, basi apiceque truncatus, verrucosus, glaber; seminibus 8-10; calice reflexo, profunde 5-lobo, intus basi excepta glabro, lobis ovatis. Aff. *D. oblongae* WALL. ex G. DON.—Borneo, Sarawak (BECCARI 830).

40. **D. Curranii** MERR.

41. **D. curraniopsis** BAKH., spec. nov.—Arbor parva. Folia membranacea, oblonga vel lanceolata, 5—20 cm longa, 1.5—7 cm lata, basi cuneata, apice acuminata, utrinque mox glabra, penninervia, nervis lateralibus laxis, tenuibus, venis inconspicuis; petiolo semitereti, glabro, 0.5—1.5 cm longo. Flores dicici, 4-5-meri; calice utrinque tomentoso; —masculi cymosi; staminibus 12-24, glabris;— feminei ovario sericeo 4-5-loculare; loculis uniovulatis. Fructus breviter pedunculatus, globosus, glabrescens, 1.5—2 cm diametro; seminibus albumine aequabile; calice 1.25—1.75 cm diam., lobis late ovatis, marginibus reflexis. Aff. *D. Curranii* MERR.—Borneo (ENDERT 4883; ELMER 21464; Boschpr. bb. 13037).

42. **D. dajakensis** BAKH., spec. nov.—Arbor mediocris. Folia coriacea, oblongo-lanceolata, 12—25 cm longa, 3.5—8.5 cm lata, basi obtusa vel rotundata, apice breviter acuminata, subtus primo pubescentia, denique glabrescentia; nervis lateralibus 6-8, tenuibus, laxis, venis obscuris, prominulis; petiolo semitereti, 1—1.5 cm longo. Fructus solitarius, breviter pedunculatus. Aff. *D. tristis* K. et G.—Borneo (Boschpr. bb. 10490).

43. **D. demona** BAKH., spec. nov.—Arbor mediocris; innovationibus basi bracteis pluribus imbricatis. Folia coriacea, oblonga, basi rotundata, apice obtusa, subtus subvelutina, nervis lateralibus utrinsecus 10-15, cum venis supra impressis; petiolo subtereti, rufo-hirto, 0.5—0.75 cm longo. Flores dioici; feminei solitarii, subsessiles, bracteis imbricatis 4-6 suffulti. Fructus subglobosus, 6—8 cm diametro; seminibus 8, albumine aequabile; calice parvo, 4-lobato, extus sericeo, intus glabro, 1.2—1.5 cm diametro; lobis late ovatis vel subreniformibus.—Pahang (HENDERSON 25030).

44. **D. densa** BAKH., spec. nov.—Arbor parva; ramulis subdensis. Folia densa, chartacea, oblonga, 2.5—7.5 cm longa, 1—2.5 cm lata, basi obtuse cuneata, apice breviter anguste acuminata, costa excepta utrinque glabra, nervis lateralibus utrinsecus 6-9, supra inconspicuis; petiolo semitereti, setoso, 0.3—0.5 cm longo. Aff. *D. poïensis* BAKH., *D. setosae* BAKH. et *D. singaporensis* BAKH.—Borneo (Boschpr. bb. 11018).

45. **D. dictyoneura** HIERN.

46. **D. Diepenhorstii** MIQ.

47. **D. discocalyx** MERR.

48. **D. discolor** WILLD.

49. **D. durionoides** BAKH., spec. nov.—Arbor alta; ramulis primo sericeis, denique glabrescentibus. Folia chartacea, elliptico-oblonga, 7—20 cm longa, 2.5—7 cm lata, basi obtusa, apice breviter acuminata, supra costa excepta glabra, subtus primo sericea, denique glabrescentia, nervis lateralibus densis, cum venis utrinque prominulis; petiolo semitereti, sericeo, 0.5—1.25 cm longo. Aff. *D. Poncei* MERR.—Borneo (Boschpr. bb. 7978, 10050 et 12456).

50. **D. Ebenum** KOEN.

51. **D. elegantissima** BAKH., nom. nov.—*Maba elegans* RIDL.—**Plate XLIX.**

52. **D. ellipsoidea** KING et GAMBLE.

53. **D. elliptifolia** MERR.

54. **D. Elmeri** MERR.

55. **D. Enderti** BAKH., spec. nov.—Folia tenuiter coriacea, elliptico-oblonga, 20—45 cm longa, 6—13 cm lata,

basi obtusa vel subcordata, apice obtusiuscule acuminata, subtus sparse pubescentia, glabrescentia, nervis utrinsecus 15-30, supra tenuiter conspicuis, venis reticulatis densis, utrinque prominulis; petiolo semitereti, tomentello, 1—2.5 cm longo. Fructus solitarius, pedunculatus, ovoideo-globosus, glaber, 5—6 cm diam.; seminibus 8-10, albumine valde ruminato; calice utrinque tomentello, 3—4 cm diam., tubo crasso, lobis late ovatis, marginibus coriaceis, inter lobos saccatim confluentibus, 1—1.5 cm longis.—Borneo (ENDERT 4017).

56. **D. eriantha** CHAMP. ex BENTH.

57. **D. eucalyptifolia** BAKH., spec. nov.—Arbuscula; ramulis glabris. Folia tenuiter coriacea, lanceolata, 9—25 cm longa, 1.5—4.5 cm lata, utrinque angustata, apice subcaudato-acuminata, utrinque glabra, nervis lateralibus utrinsecus 7-10, venis laxis, subinconspicuis; petiolo semitereti, glabro, 0.2—0.5 cm longo. Fructus solitarius, breviter pedunculatus, ovoideus, apiculatus, nitidus, glaber, 8-locularis, loculis monospermis; calice profunde 4-lobato, tubo cruciatim incrassato, lobis ovatis, acutis, coriaceis, nervosis. Aff. *D. truncatae* ZOLL. et MOR.—Borneo (AMDJAH 255).

58. **D. euphlebia** MERR.

59. **D. Everettii** MERR.

60. **D. ferox** BAKH., spec. nov.—Ramuli juniores ferrugineo-pilosi. Folia chartacea, elliptico-oblonga vel oblanceolata, 5—11 cm longa, 2—3.5 cm lata, basi subrotundata, apice acuminata vel acuta, subtus sparse pilosa, nervis lateralibus utrinsecus 15-20, supra inconspicuis, venis densis; petiolo tereti, rufo-piloso, 0.15—0.3 cm longo. Fructus solitarius, gracile pedunculatus, ovoideo-conicus, stylo rudimento apiculatus, rufo-setulosus, 4-locularis, 1.5—2 cm longus, 1—1.5 cm diam.; seminibus 4; calice 4-5-fido, extus rufo-setuloso, intus subglabro, lobis linearibus, 1.5—2 cm longis, ± 0.1 cm latis.—Borneo (Native Coll. 137).

61. **D. Forbesii** BAKH., spec. nov.—Arbuscula; ramulis verticillatis, rufo-puberulis. Folia chartacea, elliptico-oblonga, 4—12 cm longa, 2—4.5 cm lata, basi obtusa, apice breviter acuminata, subtus appresse

pubescentia, dense pellucido-punctata, nervis lateralibus utrinsecus 6-10, supra impressis, venis inconspicuis; petiolo tereti, rufo-puberulo, 0.2—0.35 cm longo. Flores dioici; feminei solitarii, subsessiles, 4-5-meri; calice profunde lobato, extus pubescente, intus glabro, lobis lineari-oblongis; ovario ovoideo, piloso, 4 loculare, loculis uniovulatis. Fructus ellipsoideus, sparse setulosus; seminibus albumine aequabile; calicis lobis 0.2—0.25 cm longis, 0.07—0.1 cm latis.—Borneo (Boschpr. bb. 12587; FORBES 3126).

62. **D. Foxworthyi** BAKH., spec. nov.—Arbor mediocris. Folia coriacea, lanceolato-oblonga, 7—25 cm longa, 2—8 cm lata, basi obtusa, apice acuminata, costa excepta utrinque glabra, nervis lateralibus utrinsecus 7-12, supra obscuris, impressis, venis inconspicuis; petiolo semitereti, glabrato, 1—1.5 cm longo. Flores dioici; masculi cymosi; calice profunde 4-lobato, intus pubescente, lobis anguste oblongis, acutis; corolla hypocrateriforme, lobis suborbicularibus, utrinque tomentellis. Fructus solitarius, breviter pedunculatus, globosus, maturitate glabratus, 3.5—4.5 cm diam., 8-locularis, locculis monospermis; seminibus albumine aequabile; calice crasso, intus tomentoso, ± 2 cm diam. —Perak (FOXWORTHY 10447; DEMALI 1220).

63. **D. frutescens** BL.

64. **D. Gambleana** BAKH., spec. nov.—Ramuli glabri. Folia coriacea, lanceolato-oblonga, 20—26 cm longa, 5—7.5 cm lata, basi cuneata, apice breviter obtuse acuminata, utrinque glabra, nervis lateralibus utrinsecus 10-15, supra leviter impressis, venis inconspicuis; petiolo subtereti, glabro, 1—1.25 cm longo. Fructus ovoideus, apiculatus, glaber, 2—3 cm longus, 1.5—2.5 cm diam.; seminibus 4, albumine aequabile; calice profunde 4-fido, utrinque glabro, 0.5—0.7 cm diametro, lobis suborbicularibus, ciliatis, imbricatis, 0.3—0.35 cm diametro, Aff. *D. Kingii* BAKH. et *D. Hiernianae* (K. et G.) BAKH.—Perak (Gunong Keledang—RIDLEY—X, 1898).

65. **D. glaucophylla** BAKH., spec. nov.—Arbor mediocris. Folia chartacea, oblonga vel oblanceolata, 5—15 cm longa, 2—6 cm lata, basi cuneata, apice breviter acuminata, subtus glauco-pruinosa; nervis lateralibus utrinsecus 7-12, supra inconspicuis,

prominulis; petiolo semitereti, glabrescente, 0.5—0.75 cm longo. Aff. *D. Havilandi* BAKH.—Sumatra (Boschpr. bb. 13016).

66. **D. graciliflora** HIERN.

67. **D. Greshoffiana** KDS., msc.—Arbor mediocris; ramulis glabrescentibus, in sicco griseis. Folia tenuiter coriacea, oblongo-elliptica, 7-17 cm longa, 3.5—5.5 cm lata, basi obtuse cuneata, apice obtusa, subtus appresse pubescentia, denique glabrescentia, basi glandulis orbicularibus, nervis lateralibus utrinsecus 7-10, tenuibus, venis inconspicuis; petiolo semitereti, glabrescente, 1—1.5 cm longo. Flores dioici, 4-5-meri. Fructus breviter pedunculatus vel subsessilis, depresso-globosus, cinereo-sericeus, 1.5—2.5 cm diametro; seminibus 8-10, albumine aequabile; calice patelliforme, leviter 4-5-lobato, intus sericeo, 1.5—2.5 cm diam.; tubo incrassato, 4-5-angulato, lobis late ovatis, marginibus anguste dilatatis.—Celebes (KOORDERS 16746β, 16750β, 16764β et 16767β).

68. **D. Hackenbergii** DIELS.

69. **D. Hallierii** BAKH., spec. nov.—Arbor mediocris; ramulis crassis, mox glabris. Folia coriacea, obverse oblonga, 20—40 cm longa, 5—13 cm lata, basi obtusa, apice acuminata, subtus mox glabra, nervis lateralibus utrinsecus 12-25, supra subinconspicuis, leviter impressis; venis reticulatis densis, utrinque obscure prominulis; petiolo crasso, semitereti, 1—1.5 cm longo. Flores dioici, 4-5-meri, subcorymbosi; calice intus glabro; corolla urceolato-oblonga, extus pubescente;—masculi staminibus 16-20, inaequalibus, antheris dorso pubescentibus;—feminei ovario ovoideo, rufo-tomentoso, 8-10-loculare, loculis uniovulatis. Fructus depresso-globosus, maturitate glabrescens, 5—7 cm diam.; seminibus albumine ruminato; calice crasso, plano, 4-6-lobato, 3.5—5 cm diam.—Borneo (HALLIER fil. 2854).

70. **D. Hasseltii** ZOLL.

71. **D. Havilandi** BAKH., spec. nov.—Folia coriacea, oblongo-elliptica vel oblanceolata, 3—8 cm longa, 1.5—4 cm lata, basi cuneata, apice subobtusa, utrinque glaberrima, subtus in sicco glauca, nervis venisque utrinque inconspicuis; petiolo semitereti, subglabro, 0.5—0.7 cm longo. Flores dioici, pedunculati, 4-meri;—masculi subracemosi, nutantes,

±1.5 cm longi; calice 4-fido, intus glabro, lobis suborbicularibus, contortis, ciliatis, 0.25—0.3 cm diam.; corolla hypocrateriforme, extus sericea, intus glabra; staminibus 12, inaequalibus, glabris; antheris lanceolatis.—Borneo, Sarawak (HAVILAND 2315).

72. **D. hebecarpa** CUNN. ex BENTH.

73. **D. Helferi** CLARKE.

74. **D. Hendersoni** RIDL.

75. **D. Hierniana** (KING et GAMBLE) BAKH., comb. nov.—*Maba Hierniana* KING et GAMBLE.

76. **D. insidiosa** BAKH., spec. nov. **Plate L.**—Arbor mediocris. Folia chartacea, ovato-oblonga, 5—17 cm longa, 2—7 cm lata, basi cuneata vel obtusa, apice breviter obtuse acuminata, costa excepta utrinque glabra, dense pellucido-punctata, nervis lateralibus utrinsecus 5-7, cum venis inconspicuis utrinque prominulis; petiolo subtereti, glabrescente, 0.5—0.7 cm longo. Fructus brevissime pedunculatus, subglobosus, basi contractus, apice rotundatus, laevis, glaber, 6—7 cm diam.; seminibus 8, albumine aequabile; calice parvo, inconspicuo, 0.3—0.5 cm diametro, lobis late triangularibus obtusis, extus pubescentibus, intus glabris.—Pahang (HENDERSON 21730).

77. **D. insularis** BAKH., spec. nov.—Folia tenuiter coriacea, oblonga-elliptica, 20—25 cm longa, ± 10 cm lata, basi cordata, subobliqua, apice angustata, in exemplum praemorsa, utrinque glabra; nervis lateralibus utrinsecus 10-12, utrinque prominentibus, venis laxis utrinque prominulis, basi glandulis orbicularibus; petiolo crassiusculo, tereti, glabro, 0.5—0.7 cm longo. Flores dioici; masculi dense fasciculati, subsessiles, 1.25—1.5 cm longi; calice cupuliforme, undulato 4-dentato vel subtruncato, intus pubescente, 0.4—0.5 cm diam.; corolla tubulosa, medio 4-lobata, extus pubescente, intus glabra; lobis late ovatis, contortis; staminibus numerosis, inaequalibus; antheris linearibus, dorso pubescentibus. Aff. *D. novoguineënsis* BAKH.— Nova Guinea, New Ireland (G. PEEKEL 4A—VI. 1921).

78. **D. Jaherii** BAKH., spec. nov.—Ramuli tomentosi. Folia membranacea, ovato-oblonga, 4—12.5 cm

longa, 2—5.5 cm lata, basi obtuse cuneata, apice breviter obtuse acuminata, utrinque costa excepta glabra, dense pellucido-punctata; nervis lateralibus 4-7, supra tenuibus impressis, venis inconspicuis; petiolo subtereti, tomentoso, 0.2—0.5 cm longo. Flores dioici 4-5-meri; masculi cymosi, subsessiles; calice profunde lobato, extus puberulo, intus glabro, lobis ovoideis, contortis, ciliatis, 0.3—0.35 cm longis, 0.2—0.25 cm latis; corolla hypocrateriforme, extus sericea, intus glabra, medio lobata; staminibus 16, inaequalibus; antheris oblongis, dorso pubescentibus.—Borneo (Jaheri 128).

79. **D. javanica** Bakh., spec. nov.—Arbor; ramulis mox glabris. Folia tenuiter coriacea, lanceolato-oblonga, 10—30 cm longa, 3—10 cm lata, basi obtusa vel rotundata, apice obtusa, utrinque mox glabra, basi glandulis 2 orbicularibus conspicuis; nervis lateralibus utrinsecus 7-10, cum venis tenuibus; petiolo semitereti, glabro, 0.5—1.5 cm longo. Flores dioici, subsessiles, 4-5-meri; calice intus sericeo; corolla ovoideo-oblonga, extus pilis reversis sericea, intus glabra;—masculi cymosi; staminibus 18, filamentis brevissimis, hispidis, antheris linearibus, apiculatis, glabris;-feminei solitarii; calice campanulato, profunde lobato, tubo subquadrato, lobis late ovatis, marginibus dilatatis, coriaceis, subplicatis; staminibus 8; ovario 8-10-loculare, loculis uniovulatis. Fructus depresso-globosus, primo sericeus, maturitate glabrescens, 2—2.5 cm diam.; seminibus albumine aequabile; calice subpatelliforme, 1.5—2 cm diam.—Java (Backer 11807; Koorders 20026β, 22007β, 26878β et 39997β).

80. **D. Kaki** Linn. fil.

81. **D. Kingii** Bakh., spec. nov.—Arbuscula; ramulis glaberrimis. Folia tenuiter coriacea, oblonga, 9—13 cm longa, 3—5 cm lata, basi cuneata, apice obtusiuscula acuminata, utrinque glabra; nervis lateralibus utrinsecus 7-10, supra obscure prominulis, venis inconspicuis; petiolo semitereti, glabro, 0.5—1 cm longo. Fructus solitarius, subsessilis, ovoideus, apiculatus, glaberrimus, $\pm$ 1.5 cm diametro; calice profunde 4-fido, utrinque glabro, 0.5 cm diam.; lobis orbicularibus, imbricatis, ciliatis. Aff. *D. brevicalycis* Boerl. et Kds. ex Kds. et *D. Gambleanae* Bakh.—Perak (King's Coll. 3072).

82. **D. koeboeënsis** BAKH., spec. nov.—Arbor mediocris; ramulis glabrescentibus. Folia tenuiter coriacea, elliptica-oblonga, 7—20 cm longa, 2.5—6 cm lata, basi obtuso-cuneata, apice breviter obtuse acuminata, utrinque mox glabra; nervis lateralibus utrinsecus 5-9, cum venis reticulatis utrinque prominulis distinctis; petiolo semitereti, glabrescente, 1—1.75 cm longo. Flores dioici; masculi cymosi, pedunculati, terni; calice urceolato, leviter 4-dentato, utrinque pubescente, 0.4—0.5 cm longo; corolla carnosa, extus sericea, intus glabra; staminibus 12-16, filamentis cum antheris dorso pubescentibus. Aff. *D. malabaricae* (DESR.) KOSTEL.—Sumatra, Banjoeasin en Koeboestreken (Boschpr. T. 741).

83. **D. Korthalsiana** HIERN.

84. **D. Kurzii** HIERN.

85. **D. lanceifolia** ROXB.

86. **D. lateralis** HIERN.

87. **D. latisepala** RIDL.

88. **D. levigata** BAKH., spec. nov.—Arbor mediocris; ramulis rufo-tomentellis. Folia coriacea, elliptico-oblonga, 8—30 cm longa, 3—12 cm lata, basi obtuse cuneata vel subrotundata, apice obtuse acuminata, costa venisque excepta utrinque glabra; nervis lateralibus utrinsecus 10-15, supra obscuris, subimpressis, secus marginem curvatis, anastomosantibus, venis reticulatis laxis, supra inconspicuis; petiolo semitereti, rufo-tomentello, 1—2 cm longo. Aff. *D. rufae* K. et G. et *D. Foxworthyi* BAKH.—Borneo (Boschpr. bb. 8053, 11089, 11255).

89. **D. Lolin** BAKH., spec. nov.—Arbor mediocris; ramulis sericeis, denique glabrescentibus. Folia coriacea, oblongo-elliptica, 10—25 cm longa, 6—10 cm lata, basi subrotundata, apice obtusa, breviter apiculata, supra nitida, glabra, subtus primo strigosa, glabrescentia; nervis lateralibus subdensis, supra inconspicuis, cum venis utrinque prominulis; petiolo semitereti, glabrescente, 0.7—2 cm longo. Flores dioici; calice 4-5-fido, extus sericeo, intus glabro; lobis suborbicularibus, imbricatis, 0.3—0.5 cm diam.; corolla tubulosa, extus sericea, intus glabra;—masculi breviter cymosi, 3-5-ni, cernui; staminibus 16-24, per paria vel pluria fasciculatis,

glabris;—feminei ovario pubescente, 8-10-loculare, loculis uniovulatis. Fructus subsessilis, depresso-globosus, apice umbilicatus, maturitate glaber, 3.5—4 cm vel ultra diam.; seminibus albumine aequabile; calice non vix accrescente, 1—1.5 cm diam.—Moluccae (ATASRIP 46; BEGUIN).

90. **D. macrophylla** BL.

91. **D. malabarica** (DESR.) KOSTEL.

92. **D. malaccensis** BAKH., spec. nov.—Arbor mediocris; ramulis glabris. Folia tenuiter coriacea, oblonga vel oblanceolata, 3.5—13.5 cm longa, 2.5—6.5 cm lata; basi cuneata, apice abrupte breviter obtuse acuminata, costa excepta utrinque glabra; nervis lateralibus utrinsecus 5-7, supra cum venis inconspicuis, leviter prominulis; petiolo semitereti, glabrescente, 0.7—1.2 cm longo. Fructus breviter pedunculatus, globosus, styli rudimento apiculatus, maturitate glabrescens, 4-locularis, 4-spermus, 1—1.5 cm diam.; seminibus albumine aequabile; calice profunde 4-fido, utrinque glabro; lobis late ovatis vel suborbicularibus, ciliatis, patentibus, 0.2—0.3 cm diametro. Aff. *D. Hiernianae* (K. et G.) BAKH.—Malacca (RIDLEY 657); Dindings (HAMID C. F. 2322).

93. **D. Malam** BAKH., spec. nov.—Arbor mediocris; ramulis tomentosis, glabrescentibus. Folia coriacea, oblongo-elliptica, 5—17.5 cm longa, 3—7.5 cm lata, basi obtusa, apice obtuse acuminata, utrinque mox glabra; nervis lateralibus utrinsecus 7-15, supra cum venis obscuris, leviter prominulis; petiolo semitereti, tomentoso, glabrescente, 0.7—1.5 cm longo. Flores dioici, pedicellati; calice campanulato, profunde 4-lobato, basi angustato, utrinque tomentoso-subvelutino; corolla ovoidea, 4-lobata, extus tomentosa, intus glabra;—masculi staminibus 20, subsessilibus, antheris oblongis apiculatis, glabris;—feminei staminodiis ± 8, glabris; ovario ovoideo, rufo-velutino, 8-loculare, loculis uniovulatis.—Borneo (Boschpr. bb. 6335, 8037—nom. vulg.: Malam, Kajoe malam).

94. **D. maritima** BL.

95. **D. micromera** BAKH., spec. nov.—Ramuli nigro-tomentosi. Folia coriacea, brevissime petiolata, lanceolato-oblonga, 3—6 cm longa, 0.7—1.7 cm lata, basi leviter cordata, apice acuminata, costa

excepta utrinque glabra, supra nitida; nervis lateralibus utrinsecus 6-9, cum venis obscuris utrinque prominulis; petiolo tereti, tomentoso, 0.15—0.3 cm longo. Flores 5-7-ni, in racemis dispositi. Aff. *D. apiculatae* HIERN.—Perak (CURTIS 3463).

96. **D. Minahasae** BAKH., spec. nov.—Arbor; ramulis primo tomentosis, denique glabratis. Folia tenuiter coriacea, oblonga, 5—25 cm longa, 2.5—10 cm lata, basi cuneata vel obtusa, apice breviter obtuse acuminata, subtus primo tomentosa, denique glabrescentia, dense pellucido-punctata; nervis lateralibus utrinsecus 7-12, statu sicco supra tenuibus, impressis, venis obscuris, utrinque prominulis; petiolo subtereti, tomentoso, 0.4—1.5 cm longo. Flores cymosi, dioici vel polygami, 4-meri; calice lobato, extus pubescente, intus glabro; corolla hypocrateriforme, extus pubescente, intus glabra;—masculi staminibus 16, inaequalibus, glabris;—feminei, calicis lobis late ovatis, acutis, striatis, 0.5—0.7 cm longis, 0.7—1 cm latis; ovario glabro, 8-loculare, loculis uniovulatis. Fructus subsessilis, subglobosus, 2—2.5 cm diam.; seminibus albumine aequabile.—Celebes (KOORDERS 16753β, 16766β et 16770β).

97. **D. mindanaënsis** MERR.

98. **D. minutiflora** BAKH., spec. nov.—Arbor mediocris; ramulis virgatis, puberulis. Folia tenuiter coriacea, elliptico-oblonga, 2.5—11 cm longa, 1—4.5 cm lata, basi obtuse cuneata, apice breviter acuminata, subtus pilosa vel glabrescentia; nervis lateralibus utrinsecus 5-7, supra cum venis inconspicuis; petiolo tereti, puberulo, 0.15—0.5 cm longo. Flores dioici, 4-meri;—feminei breviter pedunculati; calice 4-fido, extus pubescente, intus glabro; lobis subreniformibus, contortis, ciliatis, 0.25—0.3 cm diam.; corolla ovoidea, utrinque glabra. Aff. *D. lateralis* HIERN. et *D. oliganthae* MERR.—Sumatra (BEGUIN 265).

99. **D. montana** ROXB.

100. **D. muricata** BAKH., spec. nov.—Ramuli sparse pilosi. Folia coriacea, elliptico-oblonga, 10—25 cm longa, 3.5—8 cm lata, basi leviter cordata, apice acuminata, costa excepta utrinque glabra; nervis lateralibus utrinsecus 10-15, supra tenuibus, cum venis obscuris utrinque prominulis; petiolo tereti, sparse

hispido, 0.3—1.25 cm longo. Flores dioici;-feminei fasciculati, subsessiles; calice 4-5-fido, extus piloso, intus glabro, lobis ovato-oblongis, acuminatis, 0.25—0.35 cm longis, 0.15—0.2 cm latis; ovario rufo-hispido, 4-5-loculare, loculis uniovulatis. Fructus ovoideo-globosus, muricato-mamillatus, tomentosus et pilis longis hispidis, 2—2.5 cm diam.; seminibus albumine aequabile; calice non vix accrescente. Aff. *D. ferocis* BAKH.—Borneo (JAHERI 644; HAVILAND 3483).

101. **D. myrmecocalyx** (HIERN) BAKH., comb. nov.—*Maba myrmecocalyx* HIERN.

102. **D. nana** BAKH., spec. nov.—Frutex; ramulis tomentosis, glabrescentibus. Folia tenuiter coriacea, oblonga, 12—22 cm longa, 4.5—8 cm lata, basi subrotundata, apice longiter acuminata, costa excepta utrinque glabra; nervis lateralibus utrinsecus 8-10, supra impressis, venis inconspicuis; petiolo subtereti, tomentello vel glabrescente, 0.7—1 cm longo. Fructus solitarius, breviter pedunculatus, ovoideo-oblongus, acuminatus, appresse pilosus, 3—3.5 cm longus, 1.5—2 cm diam.; seminibus 4, albumine aequabile; calice parvo, 4-fido, 0.7—0.8 cm diametro, lobis suborbicularibus, ciliatis, extus pilosis, intus glabris, 0.3—0.4 cm diametro. Aff. *D. ellipoideae* K. et G.—Perak (WRAY 3214).

103. **D. nemorosa** BAKH., spec. nov.—Arbor, ramulis rufo-velutinis. Folia coriacea, elliptico-oblonga, 15—25 cm longa, 7—9 cm lata, basi rotundata, apice breviter obtuse acuminata, primo utrinque velutina, denique costa excepta supra glabra, nitida, subtus glabrescentia; nervis lateralibus utrinsecus 8-12, supra impressis, venis utrinque inconspicuis; petiolo subtereti, velutino, 1—1.5 cm longo. Fructus globosus, rufo-velutinus, (immaturo) 2.5—3 cm diam.; seminibus 8, albumine aequabile; calice profunde 4-lobato, crasso, utrinque rufo-velutino; lobis ovatis obtusis, 0.5—0.7 cm diam. Aff. *D. pauciflorae* K. et G.—Borneo (Boschpr. bb. 1603).

104. **D. neurosepala** BAKH., spec. nov.—Ramuli tomentosi, glabrescentes. Folia coriacea, oblongo-elliptica, 15—30 cm longa, 6—8 cm lata, basi subrotundata, apice abrupte breviter obtuse acuminata, vetustiora utrinque glaberrima; nervis lateralibus utrinsecus 5-10, supra sulcatis, subtus prominentibus, venis obscuris, supra impressis; petiolo

subtereti, rugoso, glabro, 1.5—2 cm longo. Fructus solitarius, longiter (± 4 cm) pedunculatus, globosus, rufo-tomentosus, maturitate glabrescens, 2.5—3 cm diam.; calice valde accrescente, profunde 4-lobato, utrinque tomentoso, lobis foliaceis, late ovatis, chartaceis, palminerviis et laxe venosis, ± 3—3.5 cm diam. Aff. *D. latisepalae* RIDL.—Borneo (BECCARI 541).

105. **D. nigra** (J. F. GMEL.) PERROTT.

106. **D. nitida** MERR.

107. **D. novoguineënsis** BAKH., spec. nov.—Frutex; ramulis glabrescentibus. Folia tenuiter coriacea, lanceolato-oblonga, 12—30 cm longa, 2—7.5 cm lata, basi obtuse cuneata, apice acuminata, utrinque glabra; nervis lateralibus utrinsecus 7-9, basalibus suboppositis, venis utrinque prominulis; petiolo semitereti, glabro, 0.5—1 cm longo. Flores dioici, sessiles;- masculi fasciculati; calice cupuliforme, leviter 4-dentato, intus glabro; corolla hypocrateriforme, extus pubescente, intus glabra; staminibus 8-10, dorso pubescentibus;- feminei solitarii; calice majore, profunde 4-lobato, utrinque pubescente, lobis oblongis, foliaceis, striatis, reflexis, 0.3—0.35 cm longis, 0.2—0.25 cm latis; staminodiis 8, glabris; ovario ovoideo, pubescente, 8-loculare, loculis uniovulatis. Fructus globosus, sericeus vel maturitate glabrescens, 2—2.5 cm diam.; seminibus albumine aequabile.—Nova Guinea (DOCTERS VAN LEEUWEN 9196; LAM 698).

108. **D. nutans** KING et GAMBLE.

109. **D. oblonga** WALL. ex G. DON.

110. **D. oligantha** MERR.

111. **D. pahangensis** BAKH., spec. nov.—Arbuscula; ramulis hispidis, deinde glabris. Folia chartacea, elliptico-oblonga, 6—12 cm longa, 1.5—2.75 cm lata, basi subrotundata, apice acuminata, subtus piloso-hispida, dense pellucido-punctata; nervis lateralibus utrinsecus 10-15, supra impressis, venis supra obscuris; petiolo tereti, rufo-hispido, 0.2—0.4 cm longo. Fructus solitarius, subsessilis, ovoideo-globosus, appresse pilosus, 4-loculare, 4-spermus, 1.5—2 cm diam.; seminibus albumine aequabile; calice 4-5-fido, extus appresse piloso, intus glabro;

lobis oblongo-lanceolatis, obtusis, ciliatis, 0.4—0.5 cm longis, 0.2—0.25 cm latis. Aff. *D. apiculatae* HIERN.—Pahang (HENDERSON 22296).

112. **D. palembanica** BAKH., spec. nov.—Arbor mediocris; ramulis rufo-tomentosis glabrescentibus. Folia coriacea, oblonga vel oblanceolata, 9—30 cm longa, 3—10 cm lata, basi subcuneata, apice breviter acuminata, subtus primo rufo-tomentosa, denique glabrescentia; nervis lateralibus utrinsecus 6-12, supra impressis, venis supra inconspicuis; petiolo subtereti, tomentoso, 0.7—1.5 cm longo. Fructus solitarius, sessilis, late ovoideus vel depresso-globosus, rugosus, primo tomentosus, maturitate glabratus, 8-10-locularis, 6-8-spermus, 4—5.5 cm longus, 5—7.5 cm diam.; seminibus albumine aequabile; calice crasso, subquadrato 4-lobo, utrinque rufo-tomentoso, 3—3.5 cm diam.; lobis late ovatis. Aff. *D. pauciflorae* K. et G.—Sumatra, Palembang (DUMAS 1560).

113. **D. papuana** VAL. nom. nud.—Arbor mediocris, ramulis glabrescentibus. Folia tenuiter coriacea, lanceolato-elliptica, 15—40 cm longa, 4—14 cm lata, basi obtusa, apice breviter obtuse acuminata, utrinque glabra; nervis lateralibus utrinsecus 12-17, supra impressis, venis reticulatis densis, utrinque prominulis; petiolo semitereti, glabro, 0.7—1.5 cm longo. Flores dioici, 4-5-meri;—masculi cymosi; calice profunde lobato, intus glabro; corolla tubulosa, extus dense pubescente, intus glabro; staminibus 12-18, pubescentibus;—feminei solitarii vel terni; calice campanulato; staminodiis 8-13, puberulis; ovario ovoideo, sericeo. Fructus depresso-globosus, maturitate glaber, 7—10 cm diam.; seminibus albumine aequabile; calice incrassato, leviter 4-5-lobato, utrinque glabrescente, 2—3 cm diam.—Moluccae, Nova Guinea.

114. **D. Paraoesi** BAKH., spec. nov.—Arbor mediocris; ramulis pilis biformibus pubescentibus, glabrescentibus. Folia chartacea, ovato-oblonga, 3—9 cm longa, 1.5—4 cm lata, basi obtuse cuneata, apice breviter acuminata, mox costa excepta utrinque glabra; nervis lateralibus utrinsecus 5-7, basalibus suboppositis, ceteris longioribus, cum venis venis inconspicuis utrinque prominulis; petiolo semitereti, puberulo, 0.3—0.5 cm longo. Aff. *D. Jaherii* BAKH.—Borneo (Boschpr. bb. 10162, nom. Daj.: Paraoesi).

115. **D. pauciflora** KING et GAMBLE.

116. **D. Peekelii** LAUTERB.

117. **D. penangiana** KING et GAMBLE.

118. **D. pendula** HASSELT ex HASSK.

119. **D. perakensis** BAKH., spec. nov.—Folia coriacea, lanceolato-oblonga, 12—25 cm longa, 3.5—10 cm lata, basi cuneata, apice acuminata, utrinque glaberrima, nervis lateralibus utrinsecus 9-12, cum venis utrinque prominulis distinctis; petiolo semitereti, glabro, 1.5—2.5 cm longo. Fructus breviter pedunculatus, ovoideo-globosus, primo tomentosus, maturitate glabratus, tuberculatus, 3.5—4 cm diam.; calice late campanulato, utrinque glabro, 2.5—3.5 cm diam., tubo incrassato, lobis marginibus dilatatis, inter lobos saccatim confluentibus. Aff. *D. rigidae* HIERN et *D. areolatae* K. et G.—Perak (WRAY 501).

120. **D. perfida** BAKH., spec. nov.—Arbor mediocris. Folia chartacea, oblonga, 7.5—25 cm longa, 2.5—8.5 cm lata, basi obtusa, apice acuminata, vetustiora utrinque glabra, dense pellucido-punctata; nervis lateralibus utrinsecus 8-12, supra leviter prominulis; petiolo semitereti, glabrescente, 0.5—1.5 cm longo. Flores dioici, 4-meri, cymosi, calice intus sericeo, lobis suborbicularibus, ciliatis, 0.2—0.3 cm diam.; corolla ovoideo-oblonga, utrinque glaberrima;—feminei staminodiis 8, glabris; ovario ovoideo, sericeo, 8-loculare, loculis uniovulatis. Fructus depresso-globosus, maturitate glabrescens, nitidus, 3—3.5 cm diam.; seminibus albumine ruminato; calice sublignoso, 3—3.5 cm diam.—Borneo (Boschw. 2327, ♀; ENDERT 2705, ♂; Boschpr. bb. 13221, ♀).

121. **D. philippinensis** A. DC.

122. **D. pilosanthera** BLANCO.

123. **D. piscicapa** RIDL.

124. **D. plectosepala** HIERN.

125. **D. poiënsis** BAKH., spec. nov.—Arbuscula; ramulis pilosis, mox glabris. Folia tenuiter coriacea, oblonga, 5—12 cm longa, 2—5 cm lata, basi cuneata, apice subcaudato-acuminata, costa excepta utrinque glabra, dense pellucido-punctata; nervis lateralibus utrinsecus 5-7, basalibus longioribus, cum

venis supra inconspicuis, leviter impressis; petiolo subtereti, rufo-hispido, mox glabro, 0.3—0.5 cm longo. Flores dioici;—feminei solitarii, subsessiles; calice 4-fido, extus puberulo, intus glabro, lobis ovato-ellipticis, ciliatis, contortis, 0.4—0.5 cm longis, 0.3—0.4 cm latis; corolla hypocrateriforme, medio 4-loba, extus puberula, intus glabra; staminodiis 4; ovario ovoideo, sericeo, 4-loculare, loculis uniovulatis. Fructus ellipsoideus, maturitate glabrescens, 2—3 cm longus, 1—1.25 cm diam.; seminibus albumine aequabile; calice non vel vix aucto, ± 1 cm diam. Aff. *D. singaporensis* BAKH. —Borneo, Mount Poi (J. et M. S. CLEMENS 20304).

126. **D. polyalthioides** KORTH. ex HIERN.

127. **D. Poncei** MERR.

128. **D. pseudo-malabarica** BAKH., spec. nov.—Arbuscula; ramulis tomentellis, denique glabrescentibus. Folia coriacea, lanceolato-oblonga, 7—17 cm longa, 2.5—6 cm lata, basi obtusa vel rotundata, apice obtuse acuminata, costa excepta utrinque glabra; nervis lateralibus utrinsecus 7-15, cum venis densis utrinque distincte prominulis; petiolo semitereti, tomentello, 1—1.25 cm longo. Fructus solitarius, brevissime pedunculatus, globosus, primo tomentellus, maturitate glabratus, nitidus, 3.5—5 cm diam.; 8-10-locularis, loculis monospermis; seminibus valde ruminato; calice profunde 4-5-lobato, intus tomentoso, lobis ovatis obtusis, coriaceis, reflexis, 1—1.5 cm diam. Aff. *D. malabaricae* (DESR.) KOSTEL.—Pulau Penang (HANIFF et MD. NUR 3496); Pahang (FOSTON 12865).

129. **D. pubicalix** BAKH., spec. nov.—Folia membranacea, elliptico-oblonga, 6—10 cm longa, 2—4 cm lata, basi rotundata vel subcordata, apice obtusa vel obtuse acuminata, nitida, subtus sparse puberula, glabrescentia; nervis lateralibus utrinsecus 6-8, basalibus ceteris longioribus suboppositis, cum venis subdensis utrinque prominulis; petiolo tereti, puberulo, 0.5—0.75 cm longo. Flores dioici, 4-meri;—masculi breviter cymosi, terni; calice medio lobato, utrinque appresse piloso; corolla hypocrateriforme, medio lobata, utrinque pubescente; staminibus 15, inaequalibus, filamentis subpuberulis, antheris lanceolatis, glabris. Aff. *D. Wrayi* K. et G.—Lower Siam (HAMID C. F. 3827).

130. **D. pubicarpa** RIDL.

131. **D. pulchra** BAKH., spec. nov.—Arbuscula vel frutex; ramulis tomentosis. Folia chartacea, oblongo-lanceolata, 15—35 cm longa, 4—15 cm lata, basi angustata, rotundata vel leviter cordata, apice acuminata, subtus sparse pilosa, dense pellucido-punctata, penninervia; costa leviter prominula; nervis lateralibus utrinsecus 15-17, cum venis utrinque prominulis; petiolo tereti, tomentoso, 0.5—0.7 cm longo. Fructus solitarius, subsessilis, oblongus vel obovoideus, acuminatis, rufo-pilosus, maturitate glabrescens, 4-locularis, 4-spermus, 3.5—6 cm longus, 2.5—3 cm diam.; seminibus albumine aequabile; calice conspicuo, 4-fido, utrinque pubescente, lobis foliaceis, lanceolato-oblongis, basi contractis, apice longiter acute acuminatis, plicatis, nervosis 3.5—8.5 cm longis, 2.5—4 cm latis.—Nova Guinea (MAYR 408).

132. **D. pyrrhocarpa** MIQ.

133. **D. retrofracta** BAKH., spec. nov.—Arbuscula; ramulis glabris. Folia coriacea, oblonga, basi cuneata, apice obtuse acuminata, subtus sparse pilosa glabrescentia; nervis lateralibus utrinsecus 10-15, cum venis densis utrinque prominulis; petiolo semitereti, primo piloso, denique glabrescente, 0.5—1.2 cm longo. Flores dioici, 4-meri;—feminei solitarii, subsessiles; calice utrinque rufo-piloso, 0.5 cm diametro; ovario sericeo, 8-loculare, loculis uniovulatis. Fructus depresso-globosus, maturitate glabrescens, 2.5—3 cm diam.; seminibus albumine ruminato; calice tubo lignoso, lobis reflexis.—Lower Siam (MD. HANIFF et MD. NUR 3984); Perlis (HENDERSON 23013).

134. **D. Ridleyi** BAKH., spec. nov.—Folia coriacea, elliptico-oblonga, 9—20 cm longa, 3—8 cm lata, basi obtusa, apice acuminata, utrinque glabra; nervis lateralibus utrinsecus 6-10, cum venis utrinque prominulis distinctis; petiolo semitereti, glabro, 1—2 cm longo. Fructus sessilis, ovoideo-globosus, nitidus, glaber, 5—8 cm diam.; 8-10-locularis, loculis monospermis; seminibus albumine ruminato; calice lignoso, 4-5-gono, extus tomentoso, intus sericeo, 3—3.5 cm diam. Aff. *D. Whitfordii* MERR.—Johore (RIDLEY).

135. **D. rigida** HIERN.

136. **D. rufa** KING et GAMBLE.

137. **D. Rumphii** BAKH., nom. nov.—*Diospyros utilis* KDS. et VAL.

138. **D. samoënsis** A. GRAY.

139. **D. sarawakana** BAKH., spec. nov.—Folia chartacea, oblonga, 7—17 cm longa, 3.5—7 cm lata, basi cuneata, apice breviter acuminata, utrinque glabra, basi biglandulosa; nervis lateralibus utrinsecus 5-8, supra indistinctis; petiolo semitereti, glabrescente, 1—1.5 cm longo. Flores dioici, 4-meri;—masculi cymosi vel subracemosi; calice profunde lobato, utrinque tomentoso; corolla tubulosa, extus tomentosa, intus glabra; staminibus 14-16, pubescentibus. Aff. *D. styraciformis* K. et G.—Sarawak (HAVILAND 2316).

140. **D. Scortechinii** KING et GAMBLE.

141. **D. selangorensis** BAKH., spec. nov.—Ramuli tomentosi. Folia coriacea, ovato-oblonga, 5—10 cm longa, 1.5—3.5 cm lata, basi subrotundata, apice acuminata, supra nitida, subtus sparse pubescentia; nervis lateralibus utrinsecus 8-10, supra impressis. venis inconspicuis; petiolo tereti, pubescente, 0.3—0.5 cm longo. Fructus solitaribus, subsessilis, ovoideus, rufo-pilosus, maturitate glabrescens, 2—2.5 cm diam.; seminibus 4, albumine aequabile; calice 4-fido, utrinque pubescente; lobis linearioblongis, acutis, ciliatis, 0.75—1 cm longis, 0.2 cm latis. Aff. *D. apiculatae* HIERN.—Selangor (BURKILL et HOLTTUM 8883).

142. **D. setosa** BAKH., spec. nov.—Arbuscula; ramulis mox glabris. Folia tenuiter coriacea, oblonga, 7—15 cm longa, 2.5—4.5 cm lata, basi obtusa, apice acuminata, utrinque glabra; nervis lateralibus utrinsecus 5-7, cum venis supra obscuris; petiolo semitereti, mox glabro, 0.5—1.25 cm longo. Fructus subsessilis, ovoideus, pubescens, 1.25—1.5 cm diam.; tomento cum setis appressis intermixto; calice 4-fido, extus piloso, intus glabro, 0.3—0.35 cm diam., lobis late ovatis obtusis reflexis. Aff. *D. singaporensis* BAKH.—Sarawak (HAVILAND 2324).

143. **D. Siamang** BAKH., spec. nov.—Arbor speciosa. Folia coriacea, elliptico-oblonga, 7—17 cm longa, 3.5—9 cm lata, basi subrotundata, apice acuta vel obtusa, subtus glabrescentia; nervis lateralibus utrinsecus

7-15, supra tenuibus, venis inconspicuis; petiolo semitereti, tomentello, 0.75—1.25 cm longo. Flores dioici, 4-5-meri;—feminei cymosi, 3-5-ni; calice profunde lobato, utrinque tomentoso, lobis ovatis; corolla tubulosa, extus tomentosa, intus glabra; staminodiis 8-10, antheris dorso pubescentibus; ovario subgloboso, sericeo, 8-10-loculare, loculis uniovulatis. Fructus subsessilis, depresso-globosus, apice concavus subtruncatus, sericeus, 3—4 cm diam.; seminibus albumine aequabile; calice tubo incrassato, lobis marginibus dilatatis, inter lobos saccatim confluentibus. Aff. *D. Wallichii* K. et G.—Sumatra (Boschpr. F. 198).

144. **D. siamensis** HOCHR.

145. **D. simaloerensis** BAKH., spec. nov.—Arbor mediocris; ramulis glabrescentibus. Folia tenuiter coriacea, oblonga, 4—15 cm longa, 1.5—4 cm lata, basi obtuse cuneata, apice acuminata, costa excepta utrinque glabra; nervis lateralibus utrinsecus 5-10, venis inconspicuis; petiolo semitereti, glabrescente, 0.2—0.5 cm longo. Flores dioici, 4-meri;—feminei gracile pedunculati; calice 4-fido, intus glabro; lobis orbicularibus, imbricatis, ciliatis, 0.2—0.3 cm diam.; ovario ovoideo, glabro, 4-loculare, loculis uniovulatis. Fructus ovoideus 2—2.5 cm diam.; seminibus albumine aequabile; calice non vel vix accrescente, 0.5 cm diam.—Sumatra, Simaloer (ACHMAD 580, 1343 et 1391).

146. **D. singaporensis** BAKH., spec. nov.—Folia tenuiter coriacea, ovato-oblonga, 6—10 cm longa, 2.5—4 cm lata, basi obtuse cuneata, apice acuminata, costa excepta utrinque glabra, nervis lateralibus utrinsecus 5-10 cum venis utrinque obscure prominulis; petiolo semitereti, glabrescente, 0.5—1 cm longo. Flores dioici, 4-meri;—feminei solitarii, pedunculati, calice 4-fido, extus pubescente, intus glabro; lobis suborbicularibus, ciliatis, 0.2—0.3 cm diam.; corolla tubulosa, extus sericea, intus glabra; staminodiis 4, pubescentibus; ovario ovoideo, subglabro, 4-loculare, loculis uniovulatis.—Singapore (Cult. Bot. Gard.).

147. **D. sogeriensis** BAKH., spec. nov.—Folia tenuiter coriacea, lineari elliptica, 7—20 cm longa, 1.5—6 cm lata, basi obtusa, apice breviter acuminata, supra glabra, subtus primo sericea, denique glabrescentia; nervis lateralibus densis, cum venis utrinque inconspicuis; petiolo semitereti, glabrescente,

0.5—0.7 cm longo. Fructus globosus, maturitate glaber, 4—4.5 cm diam.; seminibus 8, albumine aequabile. Aff. *D. celebicae* BAKH.—Nova Guinea (FORBES 276).

148. **D. soporifera** BAKH., spec. nov.—Arbor mediocris. Folia coriacea, elliptico-oblonga, 30—45 cm longa, 7.5—12.5 cm lata, basi obtusa vel rotundata, apice obtusiuscule acuminata,, utrinque glabra; nervis lateralibus utrinsecus 15-20, utrinque conspicuis, supra plano-depressis; venis reticulatis laxis, utrinque prominulis; petiolo semitereti, glabro, 1.25—2.5 cm longo. Fructus solitarius vel binus, submagnus, ovoideo-globosus, apice depressus, concavus, nitidus, glaber, immaturus 4—5 cm longus, 5—5.5 cm diam., 8-locularis, loculis monospermis; pedunculo 3.5—4.5 cm longo; calice fructifero conspicuo, reflexo, 4-lobo, utrinque glaberrimo, tubo valde incrassato, lignoso, cubiforme, 3.5—5 cm diam., 1—2 cm crasso, lobis crasse coriaceis, basi confluentibus, inter lobos subsaccatis, 1—1.5 cm longis, 2.5—3 cm latis; seminibus ellipticooblongis, compressis. Aff. *D. mindanaënsis* MERR. —Borneo (BOSCHPR. bb. 17221, ♀).

149. **D. styraciformis** KING et GAMBLE.

150. **D. subrhomboidea** KING et GAMBLE.

151. **D. subtruncata** SCHEFF. ex HOCHR.

152. **D. sumatrana** MIQ.

153. **D. sundaica** BAKH., nom. nov.—*D. pseudo-Ebenum* KDS. et VAL.

154. **D. Toposia** HAM.

155. **D. toposioides** KING et GAMBLE.

156. **D. transitoria** BAKH., spec. nov.—Arbuscula; ramulis glabrescentibus. Folia firmiter coriacea, ovato-oblonga, 4.5—12 cm longa, 1.5—4.5 cm lata, basi obtusa, apice breviter obtuse acuminata, utrinque glabrescentia; nervis lateralibus utrinsecus 7-10, cum venis densis supra inconspicuis; petiolo semitereti, glabrescente, 0.5—1.5 cm longo. Flores dioici;—feminei solitarii, longiter pedunculati; calice profunde 4-5-lobato, intus pubescente, lobis ovatis, acutis, subplicatis; ovario sericeo, 8-10-loculare, loculis uniovulatis. Fructus depresso-globosus, subsericeus, maturitate glabrescens,

2.5—3 cm diam.; seminibus albumine ruminato; calice accrescente, tubo incrassato, 4-5-angulato; lobis marginibus dilatatis, coriaceis, inter lobos saccatim confluentibus, 1.5—2 cm diametro.—Lower Siam (HANIFF et MD. NUR. 4060); Kedah (CURTIS 2626).

157. **D. tristis** KING et GAMBLE.

158. **D. truncata** ZOLL. et MOR.

159. **D. tuberculata** BAKH., spec. nov.—Arbor mediocris; ramulis glabrescentibus, vetustioribus dense verriculoso-lenticellatis. Folia tenuiter coriacea, oblonga, 5—20 cm longa, 2.5—7.5 cm lata, basi cuneata, apice anguste obtuse acuminata, utrinque subglabra; nervis lateralibus utrinsecus 5-8, supra tenuiter impressis, venis supra obscuris; petiolo semitereti, glabrescente, 0.7—2 cm longo. Fructus pedunculatus, ovoideus, glabrescens, 2.5—3 cm diam.; seminibus 1-4, albumine aequabile; calice profunde 4-lobato, intus sericeo, 2—3 cm diametro, lobis ovatis, marginibus dilatatis, coriaceis.—Borneo (AMDJAH 498; CASTRO et MELEGRITO 1409).

160. **D. Ulo** MERR.

161. **D. undulata** WALL. ex G. DON.

162. **D. venenosa** BAKH., spec. nov.—Arbor mediocris; ramulis glabris. Folia tenuiter coriacea, oblongo-lanceolata, 10—30 cm longa, 3—7 cm lata, basi obtuse cuneata, apice acuminata, utrinque glabra; nervis lateralibus utrinsecus 10—15, supra tenuiter prominulis petiolo semitereti, glabro, 1—1.5 cm longo. Fructus solitarius, brevissime pedunculatus, depresso-globosus, pallide sericeus, 8-locularis, 2—3 cm diam.; seminibus 4—8, albumine aequabile; calice plano, 4-5-angulato, utrinque sericeo, 1—2 cm diam., lobis late triangularibus obtusis. Aff. *D. Greshoffianae* KDS.—Celebes (TEYSMANN 12603, 12668).

163. **D. vestita** BAKH., spec. nov.—Arbuscula; ramulis rufo-velutinis. Folia chartacea, elliptico-oblonga, 7—22 cm longa, 2.5—8 cm lata, basi subrotundata, apice breviter obtuse acuminata, subtus rufo-subvelutina, nervis lateralibus utrinsecus 7-15, supra obscuris, impressis, venis inconspicuis; petiolo tereti, velutino, 0.5—0.7 cm longo. Fructus solitarius, subsessilis, ellipsoideus, rufo-hispidus glabrescens,

4-locularis, 1-4-spermus, immaturus 1.5—2 cm diam.; seminibus albumine aequabile; calice 4-lobato, utrinque velutino, 2—2.5 cm diam., tubo incrassato, lobis ovatis, marginibus dilatatis, inter lobos confluentibus. Aff. *D. sumatranae* MIQ.—Pahang (HENDERSON 22290).

164. **D. Wallichii** KING et GAMBLE ex KING.

165. **D. Wrayi** KING et GAMBLE.

166. **D. Yeobi** BAKH., spec. nov.—Folia subdensa, subcoriacea, oblongo-elliptica, 4—9 cm longa, 2—4 cm lata, basi cuneata vel obtusa, apice breviter acuminata, utrinque glabra, nervis venisque utrinque inconspicuis; petiolo semitereti, glabrescente, 0.7—1.25 cm longo. Fructus solitarius, sessilis, globosus, rufo-tomentosus, maturitate glabrescens, 8-10-locularis, 8-10-spermus, 2—3 cm diam.; seminibus albumine aequabile; calice plano, 4-angulato, utrinque tomentoso, 1—1.5 cm diam., lobis late ovatis obtusis, marginibus confluentibus. Aff. *D. rufae* KING et GAMBLE.—Pahang (YEOB 3229).

EXPLANATION OF PLATES.

PLATE XLVIII. **Diospyros Holttumii**, BAKH. (type HOLTTUM 15122)—A. Fruiting branch (x ½)—B. Leaf base, seen from above and from below (nat. size)—C. Flower buds, the left one with the calyx lobes removed (x 3)—D. Fruit (x 1½)—E. Fruiting calyx, outside and inside view (x 1½)—F. Calyx lobe from the outside (x 4).

PLATE XLIX. **Diospyros elegantissima**, BAKH. (type RIDLEY 16349)—A. Flowering branch (x ½)—B. Leaf branch (x 2)—C. Leaf base seen from above and from below (x 4)—D. Leaf bud (x 5)—E-L. Flower with details; E. Flower bud (x 4); F. Calyx, seen from the inner side (x 5); G. Calyx lobes, seen from the inner and outer sides (x 10); H. Corolla bud, slit lengthwise, seen from the inner side (x 5); I. Staminode (x 15); K. Ovary (x 10); L. Ovary in transverse section (x 15).

PLATE L. **Diospyros insidiosa**, BAKH. (type HENDERSON 21730)—A. Leaf branch (x ½)—B. Bark (x ½)—C. Leaf base, seen from lower and upper sides (nat. size)—D. Flowering branches (flowers fallen) (x ½)—E. Fruiting branch (x ½)—F. Fruiting calyx from outer and inner sides (x 1½)—G. Fruit cut lengthwise (x ½)—H. Half of fruit in transverse section (x ½)—I. Seeds (x ½)—K. and L. Seeds in transverse section (nat. size).

Plate 48.

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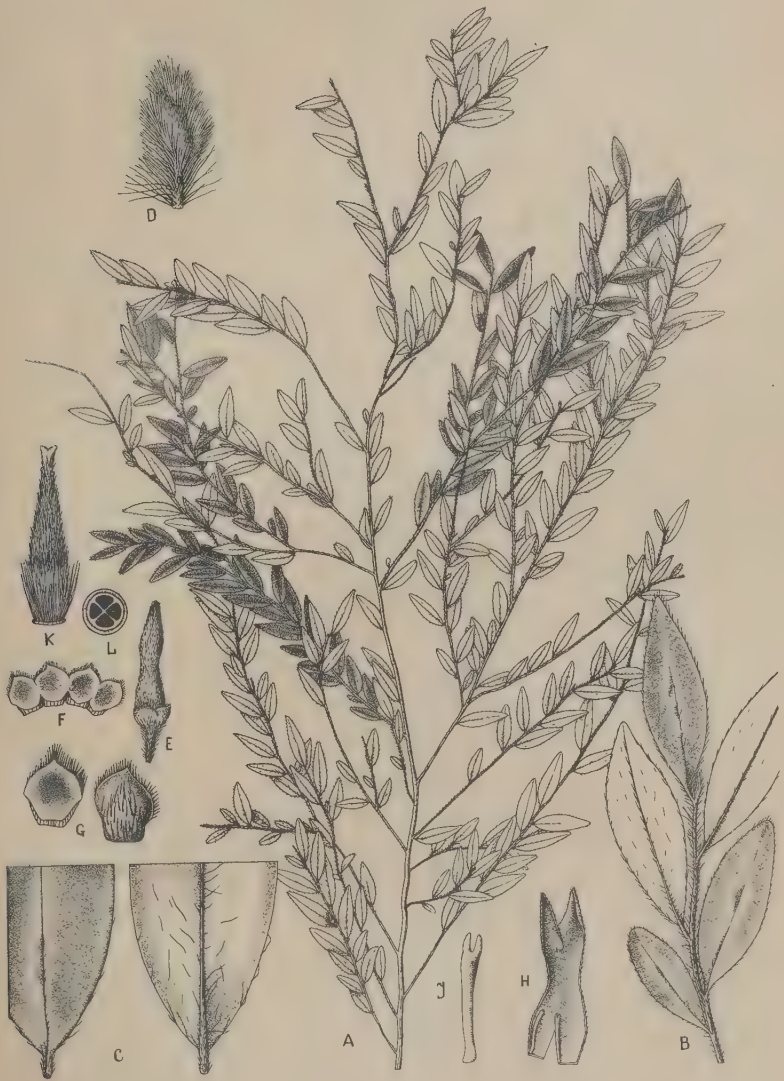
Plate 49.



Gard. Bull. S.S. Vol. VII.

Plate 50.

Gard. Bull. S.S. Vol. VII.